Canovision 8

SERVICE MANUAL

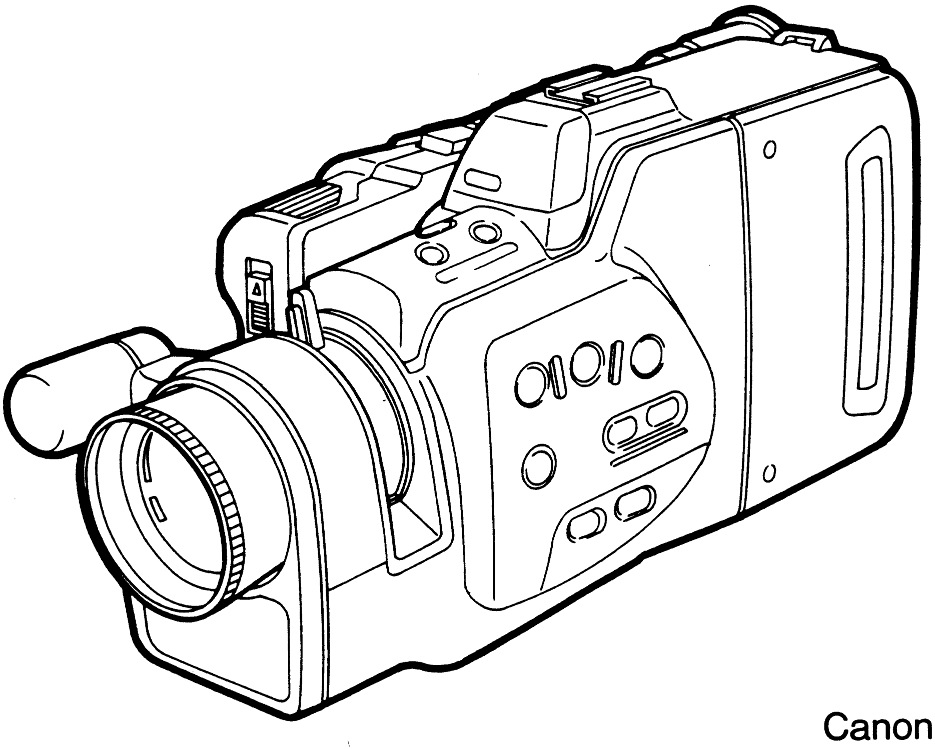
E640E,F

(REF.NO.D15-2430,2470)

8mm Video Camera & Recorder

PAL

SECAM



DY8-1152-430-000

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Video Technical Service Dept.
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SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine CANON replacement parts.
   Especially critcal parts in the power circuit block should not be replaced with other makes.
   Critical parts are marked with ⚠ in the schematic diagrams.
2. The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in the viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be same type as the original, CANON approved one.
3. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been oberheated or damaged by the short circuit.
4. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
5. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

5-1 Leakage Current Cold Check

1) Unplug the AC cord and connect a jumper between the two prongs on the plug.
2) Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metalic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metalic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

5-2 Leakage Current Hot Check

1) Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2) Connect a 1.5KΩ 10 watt resistor, paralleled by 0.15μF capacitor, between each exposed metalic parts on the unit and a good earth ground such as a water pipe, as shown in the figure below.
3) Use an AC voltmeter, with 1000Ω/volt or more sensitivity, to measure the potential across the resistor.
4) Check all exposed metallic parts of the cover (Cable connection, Handle bracket, metallic cabinet. Screwheads, Metallic overlays, etc), and measure the voltage at each point.
5) Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6) The potential at any point should not exceed 0.75V RMS.
   A leakage current tester (FLUKE MODEL: 8000A equivalent) may be used to make the hot checks.
   Leakage current must not exceed 0.5 milliamp.
   In case a measurement is out side of the limits specified, there is a possibility of a shock hazard, and corrective action must be taken before returning the instrument to the customer.

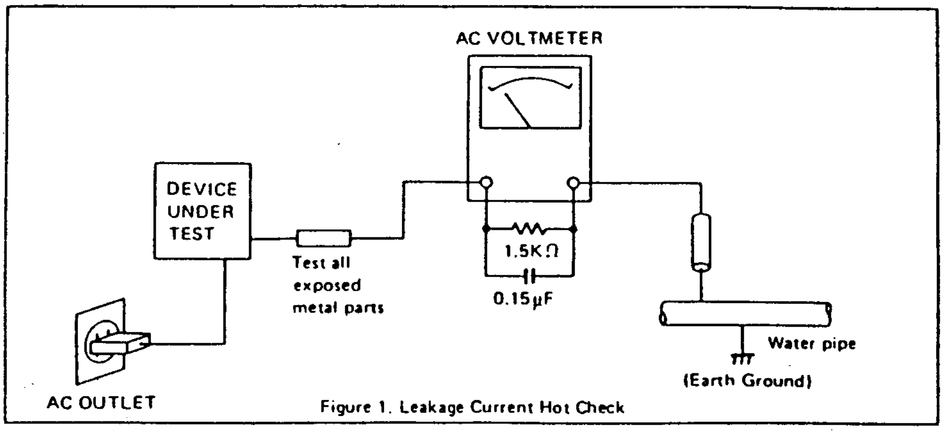

Figure 1. Leakage Current Hot Check

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CHAPTER I GENERAL DESCRIPTION OF PRODUCT

1. Product Overview

The model E640 employs newly achieved technologies such as a twin spot (dual beam) distance measuring auto focus system, auto frame/backlight compensation, auto knee mechanisms, etc. succeeding the conventional "flexigrip".

Also, the E640 employs E808's 8x zoom lens of standard 8 mm format system.

1-1 Features

1) Superlative picture quality

   ° 8x zoom lens

2) Multiple functions

   ° Multi-AF functions
     Twin spot (dual beam)/auto frame/focus memory/zoom memory
   ° Dual titling (digital title memory/character generator)
   ° 2-mode timer recording (self timer/interval timer)
   ° Zoom lens with both telephoto/wide angle ends macro mechanism
   ° High speed shutter (1/2000, 1/1000, 1/500, 1/250)
   ° High speed recording search (20 times of normal speed)

3) Easy operation

   ° EVF built-in 180° rotary "Flexigrip"
   ° Wireless Controller WL-200 provided
   ° Sports Finder SF-100 provided
   ° Linear tape counter

1-2 Nomenclature

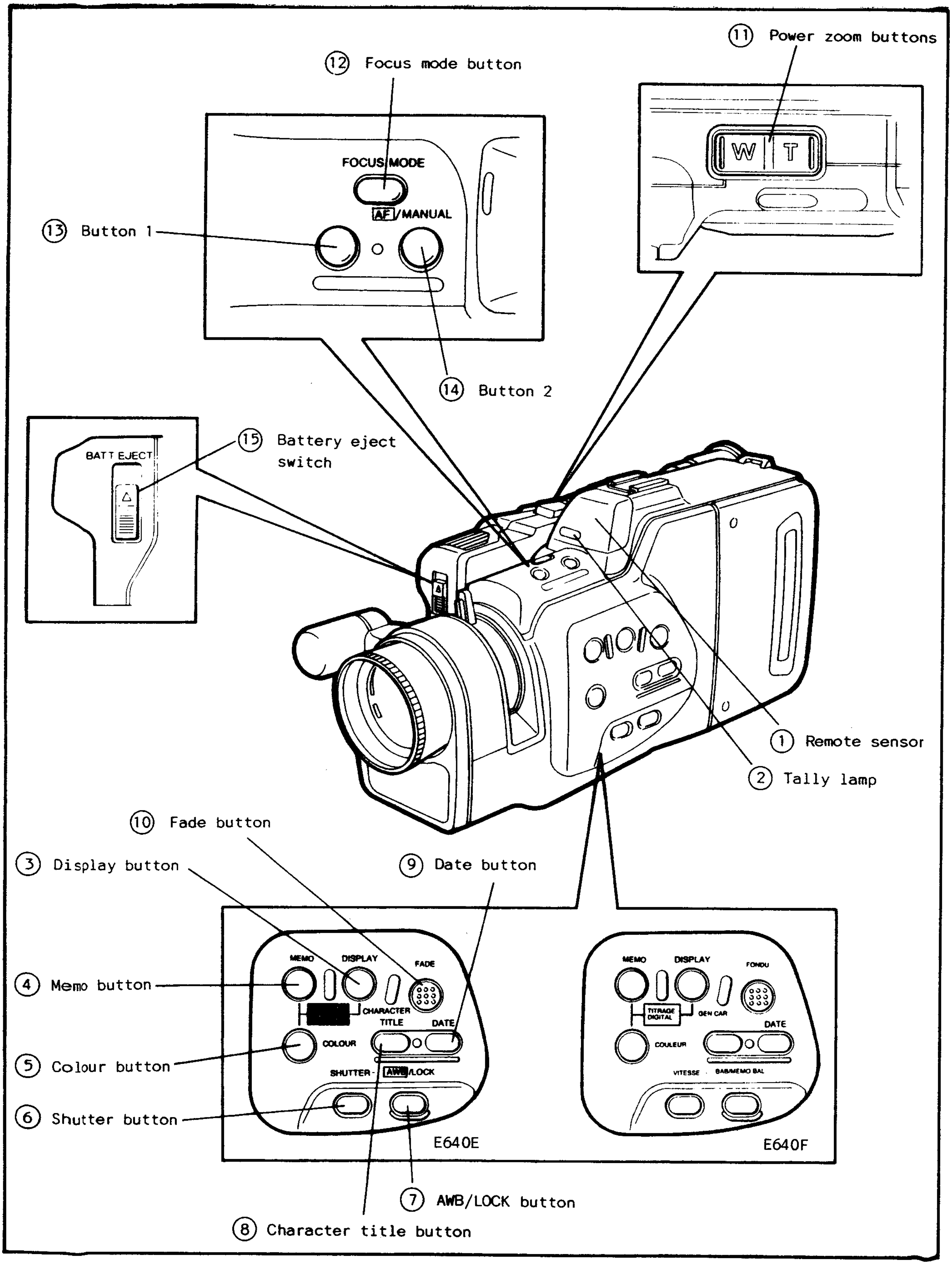

⑪ Power zoom buttons
⑫ Focus mode button
FOCUS MODE
AF/MANUAL
⑬ Button 1
W
T
⑭ Button 2
BATT EJECT
⑮ Battery eject switch
① Remote sensor
② Tally lamp
⑩ Fade button
③ Display button
⑨ Date button
④ Memo button
MEMO
DISPLAY
FADE
CHARACTER TITLE
DATE
COLOUR
SHUTTER
AWB/LOCK
⑤ Colour button
⑥ Shutter button
E640E
MEMO
DISPLAY
FONDU
TITRAGE DIGITAL
GEN CAR
DATE
COULEUR
VITESSE
BAB/MEMO BAL
E640F
⑦ AWB/LOCK button
⑧ Character title button

Fig. I-1

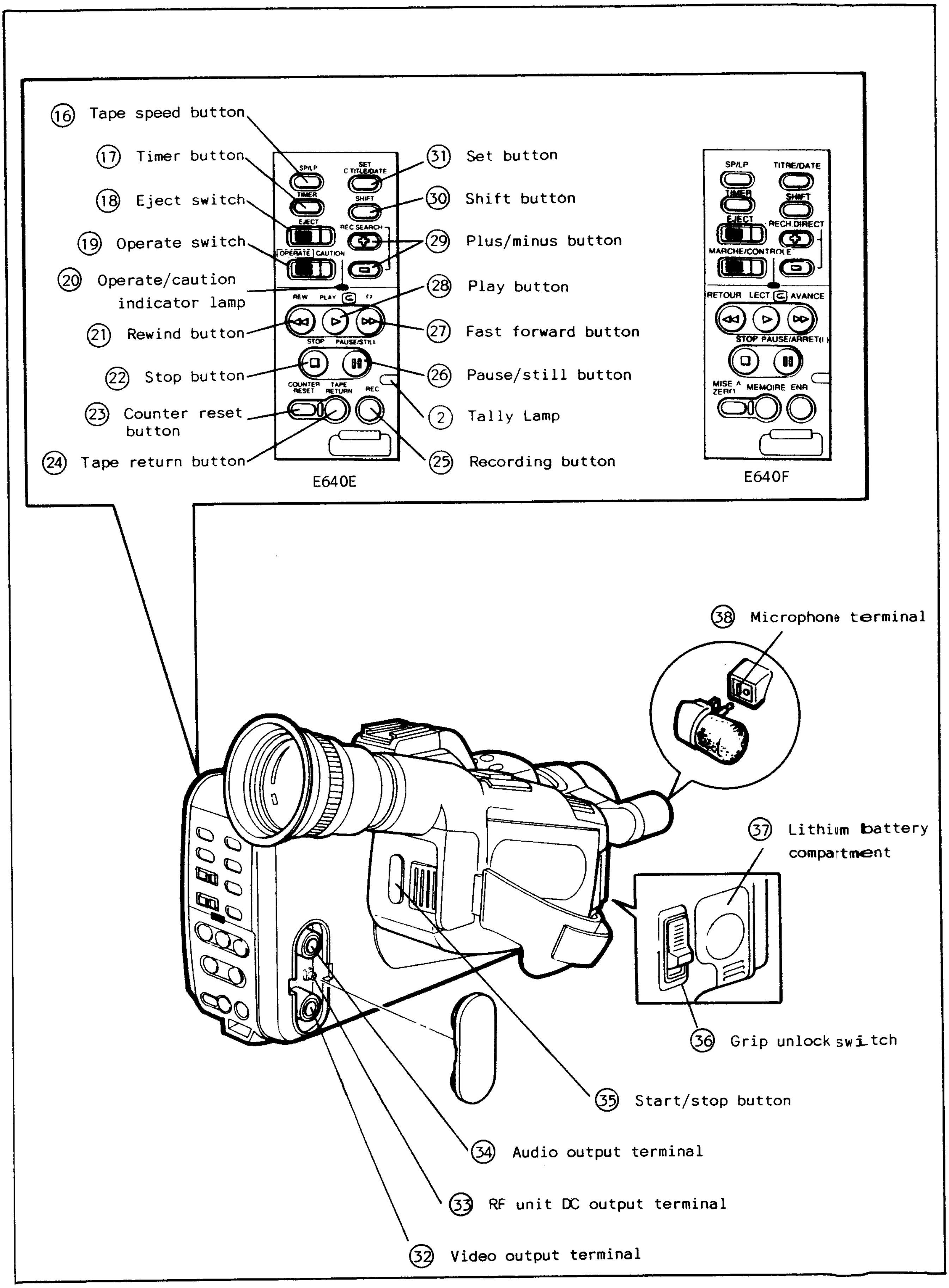

⑯ Tape speed button
⑰ Timer button
⑱ Eject switch
⑲ Operate switch
⑳ Operate/caution indicator lamp
㉑ Rewind button
㉒ Stop button
㉓ Counter reset button
㉔ Tape return button
㉛ Set button
㉚ Shift button
㉙ Plus/minus button
㉘ Play button
㉗ Fast forward button
㉖ Pause/still button
② Tally Lamp
㉕ Recording button
SP/LP
SET C TITLE/DATE
TIMER
SHIFT
EJECT
REC SEARCH
OPERATE
CAUTION
REW
PLAY
FF
STOP
PAUSE/STILL
COUNTER RESET
TAPE RETURN
REC
E640E
SP/LP
TITRE/DATE
TIMER
SHIFT
EJECT
RECH DIRECT
MARCHE/CONTROLE
RETOUR
LECT
AVANCE
STOP
PAUSE/ARRET(I)
MISE A ZERO
MEMOIRE
ENR
E640F
㊳ Microphone terminal
㊲ Lithium battery compartment
㊱ Grip unlock switch
㉟ Start/stop button
㉞ Audio output terminal
㉝ RF unit DC output terminal
㉜ Video output terminal

Fig. I-2

1-3 Brief explanation of control buttons, terminals and external parts

① **Remote sensor**

The remote control signal is received through this window.
Light receiving angle (versus the front face of remote sensor window):
Approx. 30° at left/right
Approx. 15° at upper/lower

② **Tally lamp**

This lamp flashes during the recording, self-timer or the interval timer operations. Also, it lights up when the remote control signal is received.

Recording	flashes at 1 Hz
Self-timer	ON; 0.5 sec. OFF; 1.5 sec
Interval timer	ON; 0.5 sec. flashes
Remote controller used	lights up

③ **Display button** (DISPLAY)

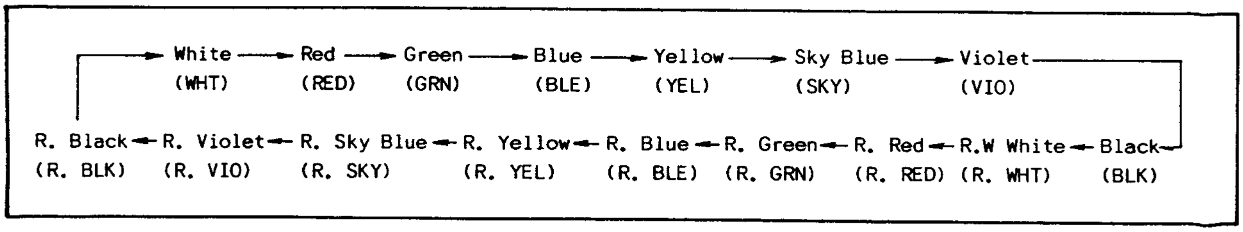
Pressing this button in camera mode presents the digitally-memorized title on screen.
In camera recording, the imposition on pictures is possible.

④ **Memo button** (MEMO)

The image can be memorized digitally by pressing this button. Also, by pressing and holding down, even an image having weak contrast (or excessively strong contrast) is automatically adjusted to the image having suitable color density for recording. The color density is getting thicker and thinner in 8 levels, respectively. (Thinnest → 8 levels → original color → 8 levels → thickest)
While functioned, the image is displayed in monochrome.

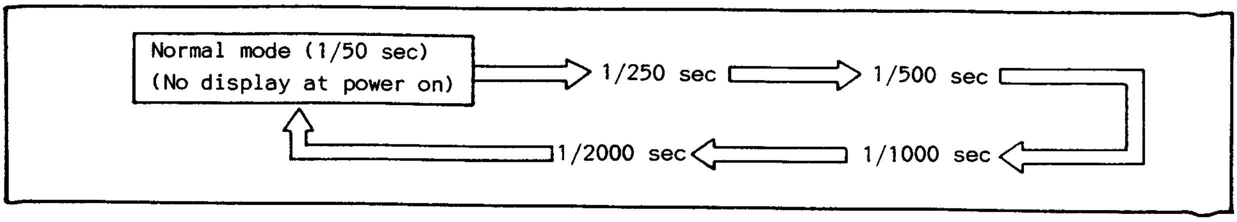
⑤ **Colour button** (COLOUR)

(For coloring the digital title memory which recorded by MEMO button ④)
The desired color can be chosen by pressing this button. 8 colors are provided. Each press changes the color in a cyclic manner as shown below. (normal, reverse, see-through and reverse see-through)
If the button is pressed more than 3 seconds, color goes into "see-through" (transparent) mode, that is, the recorded scene is visible through the color.


White (WHT)
Red (RED)
Green (GRN)
Blue (BLE)
Yellow (YEL)
Sky Blue (SKY)
Violet (VIO)
Black (BLK)
R.W White (R. WHT)
R. Red (R. RED)
R. Green (R. GRN)
R. Blue (R. BLE)
R. Yellow (R. YEL)
R. Sky Blue (R. SKY)
R. Violet (R. VIO)
R. Black (R. BLK)

⑥ **Shutter button** (SHUTTER)

In camera mode, each press of this button changes the shutter speed to 1/250, 1/500, 1/1000 and 1/2000 sec (then to the normal speed) in a cyclic fashion as indicated below. The selected speed is displayed on the viewfinder screen.


Normal mode (1/50 sec)
(No display at power on)
1/250 sec
1/500 sec
1/1000 sec
1/2000 sec

⑦ **AWB/LOCK button** (AWB /LOCK)

In camera mode, each press of this button switches the white balance setting from auto to lock and vice versa.
When the white balance is locked, the message "WB LOCK" is displayed on the viewfinder screen.

⑧ **Character title button** (TITLE)

Pressing this button in camera mode presents the memorized title on the screen. In camera recording, the user-created title can be imposed on pictures.

⑨ **Date button** (DATE)

Pressing this button in camera mode presents the date/time indication on the viewfinder screen. In camera recording, the date/time can be imposed on pictures.

Not displayed (At power-on) ⇨ 1. JAN. 1989 (Only date displayed) ⇨ Not displayed ⇨ 12:00 AM (Only time displayed) ⇨ Not displayed ⇨ 12:00 AM 1. JAN. 1989 (Time and date displayed)

⑩ **Fade button** (FADE)

When this button is pressed and held on for 4 minutes or more, the picture and sound disappear gradually (fading out). By releasing, they appear gradually (fading-in). The fading is not interlinked with the trigger button.

⑪ **Power zoom buttons** (W/T)

By pressing these buttons, an angle of view is zoomed in/out to wide/telephoto direction.

⑫ **Focus mode button** (FOCUS MODE)

By pressing in camera mode, auto frame, focus memory and zoom memory functions can be selected.
Each press switches over the mode in a cyclic fashion as shown below. (Selected mode is displayed on the viewfinder screen.)

Power on No display ⇨ A. FRAME (blinks) ⇨ F. MEMO (blinks) ⇨ Z. MEMO (blinks) ⇨ Power on No display

A. FRAME (auto frame) .... (effective range: 1.2 - 6 m)	Focal distance of lens can be automatically set so that the upper half of the human torso (subject) is included on the screen constantly.
F. MEMO (focus memory) .... (effective range: 1.2 m - infinity)	Focusing ring returns automatically to the initially memorized position even when the subject is not on the center of the screen.
Z. MEMO (zoom memory) .... (effective range: f = 9.4 mm - in the memory telephoto end)	Zoom ring returns automatically to the memorized position.

⑬ **Button 1**

1) Auto frame mode ..... For resetting, a focusing ring is set to 1.2 m position, and a zoom ring is set to 9.4 mm position.
2) Focus memory mode ... Focal distance of subject is memorized.
3) Zoom memory mode .... Angle of view is memorized.

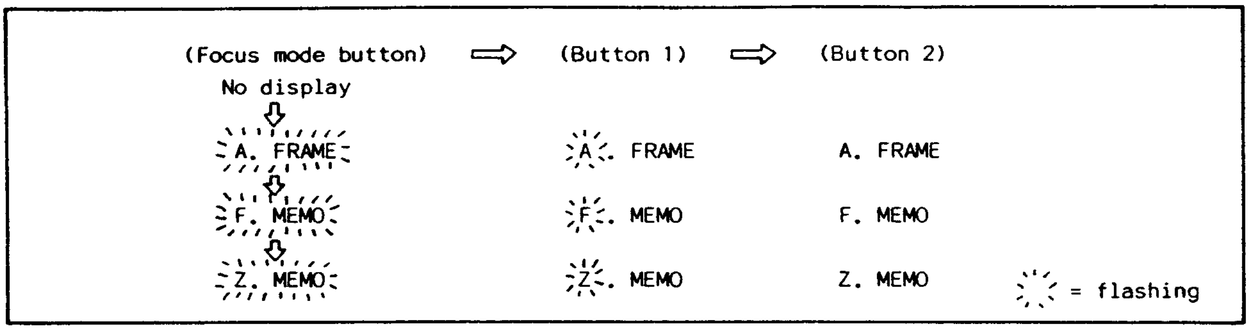
* Note: To prevent set data clearing, do not turn the followings manually after the completion of each setting.

1. Auto frame ..... focus ring, zoom lever
2. Focus memory ... focus ring
3. Zoom memory .... zoom lever

⑭ **Button 2** (AF /MANUAL)

1) Auto frame mode ... . According to the focal distance of subject, a zoom ring is automatically adjusted.
2) Focus memory mode ... A focusing ring returns to the memorized position.
3) Zoom memory mode .... A zoom ring is adjusted to the memorized angle of view.

* Remarks: To set the normal mode (for resetting), push the focus button ⑫. On EVF screen, the following indications are displayed.


(Focus mode button)
(Button 1)
(Button 2)
No display
A. FRAME
F. MEMO
Z. MEMO
A. FRAME
F. MEMO
Z. MEMO
A. FRAME
F. MEMO
Z. MEMO
= flashing

⑮ **Battery eject switch** (BATT EJECT)

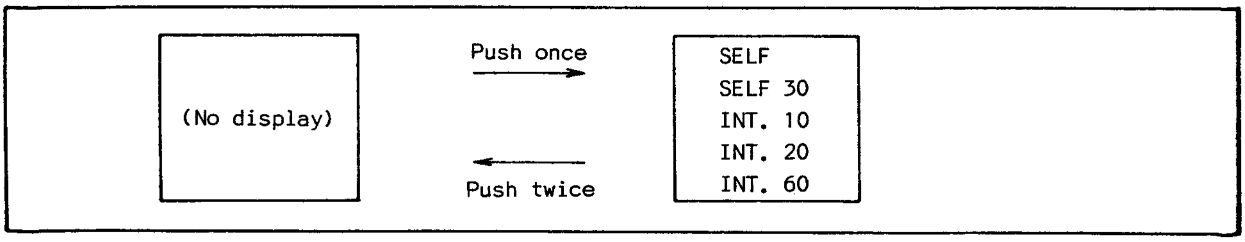
Slid this switch when taking the battery from the battery box.

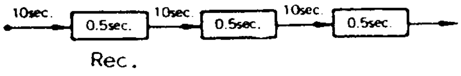
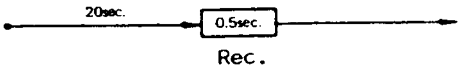
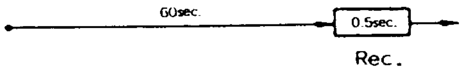
⑯ **Tape speed button** (SP/LP)

Used for mode SP/LP selection. The selected mode is displayed on the viewfinder screen ex.: on selection of the SP mode, "SP" message is displayed on the viewfinder screen.

⑰ **Timer button** (TIMER)

By pressing this button once in the recording pause mode, "Self-Interval" indication is displayed on viewfinder screen. For releasing, push the button again.


(No display)
Push once
Push twice
SELF
SELF 30
INT. 10
INT. 20
INT. 60

Mode (SELF/INT.)	Operation	Display in EVF screen
*SELF	Rec. Pause Rec.	SELF 10 ⋮ SELF 1
*SELF 30	Rec. Pause Rec. Rec. Pause	SELF 10 ⋮ SELF 1 SELF 30 ⋮ SELF 1
*INT. 10	 10sec. 0.5sec. 10sec. 0.5sec. 10sec. 0.5sec. Rec.	INT.10
*INT. 20		INT.20
*INT. 60		INT.60

⑱ **Eject switch** (EJECT)
In other than the recording mode, pressing this switch eject the cassette tape.

⑲ **Operate switch**
Used to turn power on/off.

⑳ **Operate/caution indicator lamp** (OPERATE/CAUTION)
When the machine condition is normal and the power switch is pushed, this indicator lamp lights up. It blinks if any irregularity (e.g. insufficiency of battery voltage) takes place.

㉑ **Rewind button** (REW/◀◀)
Pressing this button in stop mode rewinds the tape. And, holding down this button in the playback mode reproduces the fast-motion pictures (9 x fast motion). In the playback mode, releasing this button causes the machine to perform normal playback again. Also, if it is held down during tape rewinding, the pictures are playbacked backward rapidly.

㉒ **Stop button** (STOP/■)
Pressing this button causes tape drive to stop.

㉓ **Counter reset button** (COUNTER RESET)
In any mode, pressing this button causes the linear tape counter to be reset to 0:00:00.

㉔ **Tape return button** (TAPE RETURN)
Pressing this button in stop mode rewinds the tape rapidly until the linear tape counter reaches (0:00:00) level. The linear tape counter is reset to (0:00:00) automatically when the tape cassette is unloaded/loaded.
The linear tape counter is countable up to ±4:16:59.

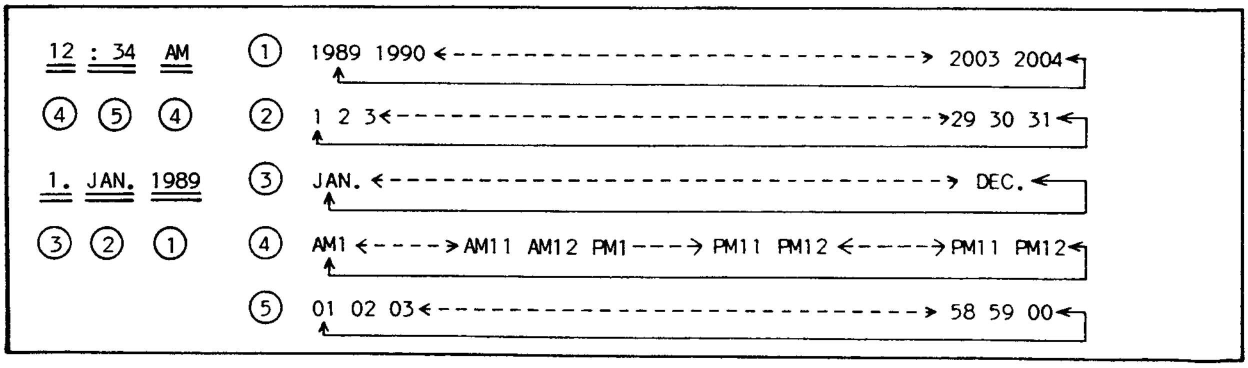
㉕ **Recording button** (REC)
When this button is pressed in stop state or still playback mode the machine is put in the recording pause mode.

㉖ **Pause/still button** (PAUSE/STILL/ ❚❚)
Pressing this button during playback causes the machine to go to the still playback mode (Frame still). When this button is pressed in the still playback mode, the machine goes back to the normal playback mode. Also, pressing it during recording sets up the recording pause state. And, when it is pressed in the recording pause state, the machine resumes recording operation.

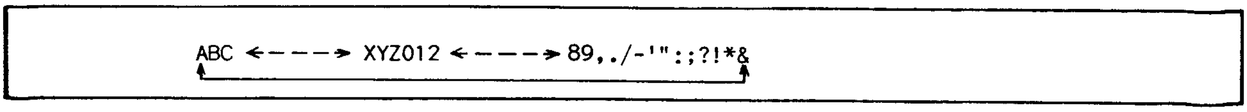
㉗ **Fast forward button** (FF/ ▶▶)
Pressing this button in the pause state causes the tape to be fed fast. If it is held down during playback, the pictures are playbacked rapidly (at a speed of 9 x fast motion). When it is released, the machine resumes normal playback operation. Also, if this button is held down for fast-forward operation, the fast-forward playback opeation (20 x fast motion) is continued.

㉘ **Play button** (PLAY/ ▶)
In other than the recording and the recording pause modes, pressing this button starts playback operation. In the recording pause mode, by pressing of this button the previous recording for approx. 3 seconds is playbacked to allow the user to check it.

㉙ **Plus/minus button** (+/-)
Any setting is allowed for the auto date function (years, months, days, hours, minutes).

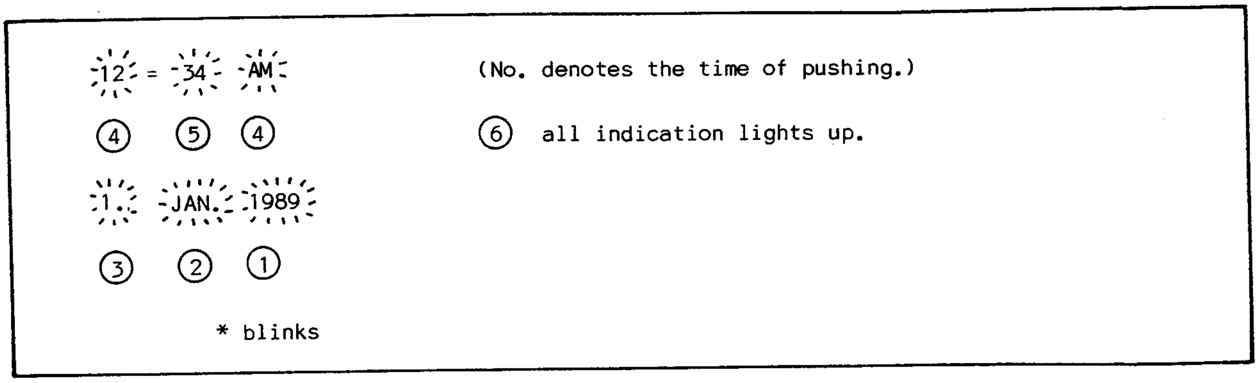


Usable for selection of alphanumeric character/special symbol in title.



* Title cannot be created during the line input or recording. (Also, the recording operation is not permitted when the line input is connected.)
In recording pause state, by pressing and holding down the + button, the tape is fed forward, and by pressing and holding down the - button, the tape is playbacked backward.
By releasing these buttons, the recording pause mode enters again.

㉚ **Shift button** (SHIFT)
Used for setting the auto date function.
Each press of this button shifts the prompt from "years" to "months", "days", "hours" and "minutes".

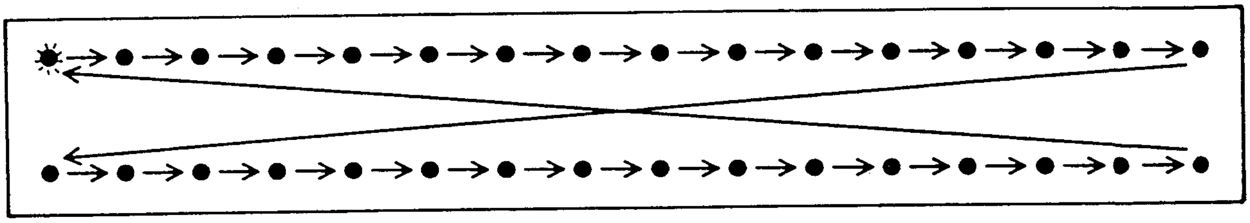


(No. denotes the time of pushing.)

⑥ all indication lights up.

* blinks

Used for shifting the character position of title (16 characters on 2 lines)



㉛ **Set button** (C. TITLE/DATE)
By pressing this button once, the title mode is set. Then, by manipulating the plus/minus and the SHIFT buttons, the title can be created. On completion of the title making, press the title/date button again. This stops the blinking of title.
When this button is pressed for more than 3 seconds, "months, days, years/hours, minutes" mode is set. By manipulating each button, the displayed prompt can be changed.

㉜ **Video output terminal**
Output terminal for video signal. The RF unit is available where this machine is connected with the television receiver not equipped with the video input terminal.

㉝ **RF unit DC output terminal**
Used for power supply (+5 V) terminal when connected with the RF unit (RU-E3E).

㉞ **Audio output terminal**
Output terminal for audio signal. The RF unit is available where this machine is connected with the television receiver not equipped with the audio input terminal.

㉟ **Start/stop button**
Pressing this button in the recording pause state causes the machine to resume recording.
When this button is pressed again, the recording pause state is set up again.
This button is also usable to start/cancel the self/interval timer function.

㊱ **Grip unlock switch**
By pressing and holding down this button, the grip can be rotated.
The grip is fixed by releasing this button.

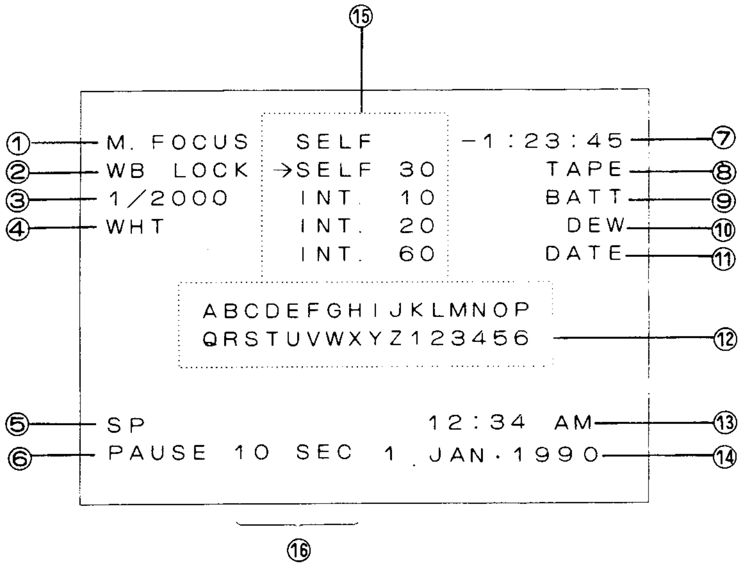
㊲ **Lithium battery compartment**
Contains the lithium battery for auto date function. The lithium battery has a service life of approx. one year.

㊳ **Microphone terminal**
Used as a terminal for the regular microphone and the external monaural microphone.

1-4 Information display on electronic viewfinder (EVF)

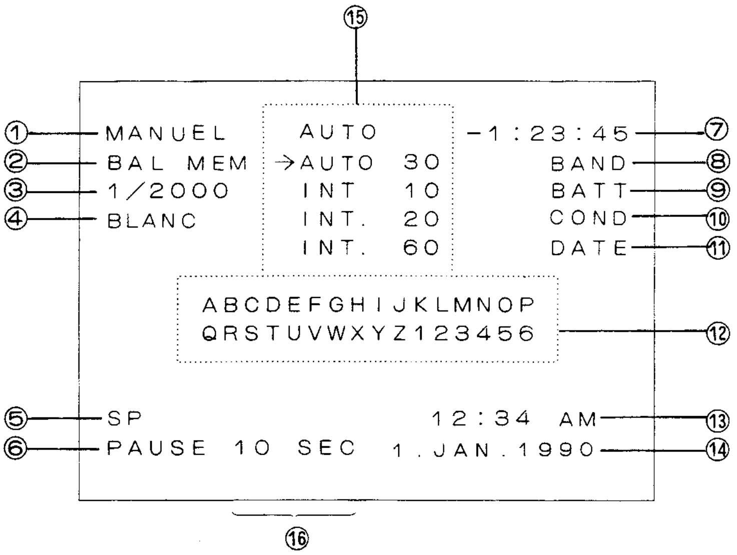
The electronic viewfinder lets the user readily know the units current status. It displays the camera operating status, recorder operating mode, warning message, digital title memory mode, etc. Furthermore, the user can select the normal display mode (auto date/title display) or the timer setting menu mode at a touch of the button.

The 16 types of displays are provided as follows.


⑮
① M. FOCUS
② WB LOCK
③ 1/2000
④ WHT
SELF
→SELF 30
INT 10
INT. 20
INT. 60
-1 : 23 : 45 ⑦
TAPE ⑧
BATT ⑨
DEW ⑩
DATE ⑪
ABCDEFGHIJKLMNOP
QRSTUVWXYZ123456 ⑫
⑤ SP
⑥ PAUSE 10 SEC
12 : 34 AM ⑬
1 JAN · 1990 ⑭
⑯

No.	Mode	Display	Description
①	Focus	No display M. FOCUS A. FRAME F. MEMO Z. MEMO	Autofocus Manual focus Auto frame Focus memory Zoom memory
②	White Balance	No display WB LOCK	Auto white balance White balance lock
③	High Speed Shutter	No display 1/250 1/500 1/1000 1/2000	Normal shutter speed (1/50) 1/250th of a second 1/500th of a second 1/1000th of a second 1/2000th of a second
④	Digital Title	WHT (RED, GRN, BLU, YEL, SKY, VIO, BLK) <WHT> R.WHT <R.WHT>	Digital title colour selection: white, red, green, blue, yellow, sky blue, violet, black See-througn colour (The same 8 colours can be selected.) Reverse colour (The same 8 colours can be selected.) Reverse see-through colour (The same 8 colours can be selected.)

No.	Mode	Display	Description
⑤	Tape Speed	SP LP	Standard play Long play
⑥	Operation	No display PAUSE REC PLAY STILL STOP FF REW EJECT EJECT (flashes)	Record search Record pause Recording Normal playback, fast forward (9X) playback, or rewind (7X) playback Still playback Stop Fast forward or fast forward (14X/28X) playback Rewind or rewind (14X/28X) playback Eject function is operated Safety mechanism functions
⑦	Tape Counter	– 4:16:59 to 4:16:59	Tape counter reading
⑧	Tape	TAPE (flashes) T.END	No cassette loaded Tape reaches the end
⑨	Battery	BATT (flashes)	Battery charge is nearly exhausted
⑩	Condensation	DEW (flashes)	Condensation is detected in camera
⑪	Lithium Battery	DATE (flashes)	Lithium battery charge is low or no battery is inserted
⑫	Character Title	2 lines × 16 characters	Alphabet (A-Z), numerals (1-9), and 12 symbols
⑬	Time	12:00 AM to 11:59 PM	Present time
⑭	Date	1. JAN. 1989 to 31. DEC. 2004	Current date
⑮	Timer Recording Menu	→ SELF SELF 30 INT.10 INT.20 INT.60	→ Arrow indicates selected mode
⑯	Timer Recording	0SEC — 10SEC 10SEC — 1SEC 30SEC — 1SEC INT.10 INT.20 INT.60	Recording reminder Self timer countdown Self 30 recording 10 sec. interval timer 20 sec. interval timer 60 sec. interval timer


⑮
① MANUEL
② BAL MEM
③ 1/2000
④ BLANC
AUTO
→AUTO 30
INT 10
INT. 20
INT. 60
−1 : 23 : 45 ⑦
BAND ⑧
BATT ⑨
COND ⑩
DATE ⑪
ABCDEFGHIJKLMNOP
QRSTUVWXYZ123456 ⑫
⑤ SP
⑥ PAUSE 10 SEC
12 : 34 AM ⑬
1 . JAN . 1990 ⑭
⑯

N°	Mode	Affichage	Description
①	Mise au point	Pas d'affichage MANUEL CA MEMO AF MEMO ZO MEMO	Mise au point automatique Mise au point manuelle Cadrage automatique Mémoire de mise au point Mémoire de zoom
②	Balance des blancs	Pas d'affichage BAL MEM	Balance automatique des blancs Balance des blancs verrouillée
③	Vitesse d'obturation rapide	Pas d'affichage 1/250 1/500 1/1000 1/2000	Vitesse d'obturation normale (1/50) 1/250ème de seconde 1/500ème de seconde 1/1000ème de seconde 1/2000ème de seconde
④	Titrage digital	BLANC (ROUGE, VERT, BLEU, JAUNE, CIEL, VIO, NOIR) <BLA> I.BLANC <I.BLA>	Choix des couleurs de titre: blanc, rouge, vert, bleu, jaune, bleu ciel, violet, noir Transparent Possibilité de choisir parmi les 8 couleurs précédentes Couleur inversée Possibilité de choisir parmi les 8 couleurs précédentes Transparent inversé Possibilité de choisir parmi les 8 couleurs précédentes

N°	Mode	Affichage	Description
⑤	Vitesse de défilement	SP ou LP	Affichage de la vitesse de bande.
⑥	Fonctionnement	Pas d'affichage PAUSE ENR. LECT. ARRET STOP AVAN. RET. EJECT EJECT (clignote)	Recherche visuelle Pause tournage Tournage Lecture normale, lecture en avance rapide ou rebobinage Arrêt sur image Arrêt Avance rapide Rebobinage Ejection Déclenchement du mécanisme de sécurité
⑦	Compteur de bande	– 4:16:59 à 4:16:59	Lecture du compteur de bande
⑧	Bande	BANDE (clignote) BANDE	Pas de cassette dans l'appareil Fin de la bande
⑨	Batterie	BATT (clignote)	Indique que la batterie arrive à épuisement
⑩	Buée	DEW (clignote)	De la buée est détectée à l'intérieur du camescope
⑪	Batterie au lithium	DATE (clignote)	La batterie au lithium est faible ou il n'y a pas de batterie dans l'appareil
⑫	Titrage	2 lignes × 16 caractères	Lettres de l'alphabet (A-Z), chiffres (1-9), et 12 symboles
⑬	Heure	12:00 AM à 11:59 PM	Indique l'heure présente (12:00 à 23:59)
⑭	Date	JAN. 1. 1989 à DEC. 31. 2004	Date courante
⑮	Mode retardateur et intervallomètre	→ AUTO AUTO 30 INT.10 INT.20 INT.60	→ La flèche indique le mode choisi
⑯	Tournage avec retardateur et intervallomètre	0SEC — 10SEC 10SEC — 1SEC 30SEC — 1SEC INT.10 INT.20 INT.60	Rappel de mode tournage Compte à rebours du retardateur Retardateur réglé sur 30 secondes Intervallomètre réglé sur 10 secondes. Intervallomètre réglé sur 20 secondes. Intervallomètre réglé sur 60 secondes

1-5 E640E,F system chart

- PAL system (E640E)

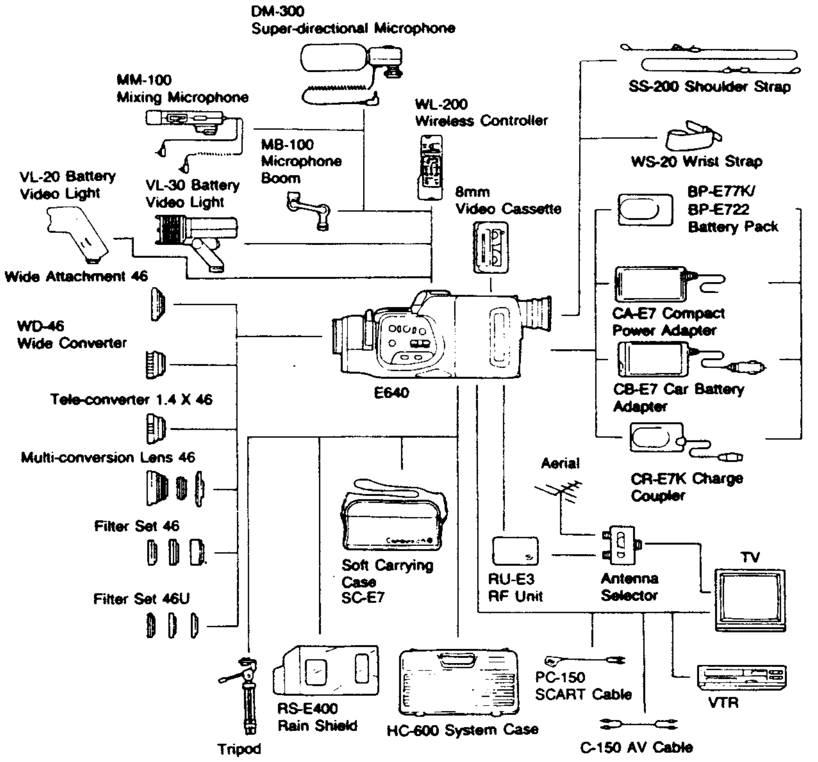

DM-300
Super-directional Microphone
MM-100
Mixing Microphone
SS-200 Shoulder Strap
WL-200
Wireless Controller
MB-100
Microphone
Boom
WS-20 Wrist Strap
VL-20 Battery
Video Light
VL-30 Battery
Video Light
8mm
Video Cassette
BP-E77K/
BP-E722
Battery Pack
Wide Attachment 46
WD-46
Wide Converter
CA-E7 Compact
Power Adapter
E640
CB-E7 Car Battery
Adapter
Tele-converter 1.4 X 46
Multi-conversion Lens 46
Aerial
CR-E7K Charge
Coupler
Filter Set 46
Soft Carrying
Case
SC-E7
RU-E3
RF Unit
Antenna
Selector
TV
Filter Set 46U
PC-150
SCART Cable
VTR
RS-E400
Rain Shield
HC-600 System Case
Tripod
C-150 AV Cable

Fig. I-3-1

- SECAM system (E640F)

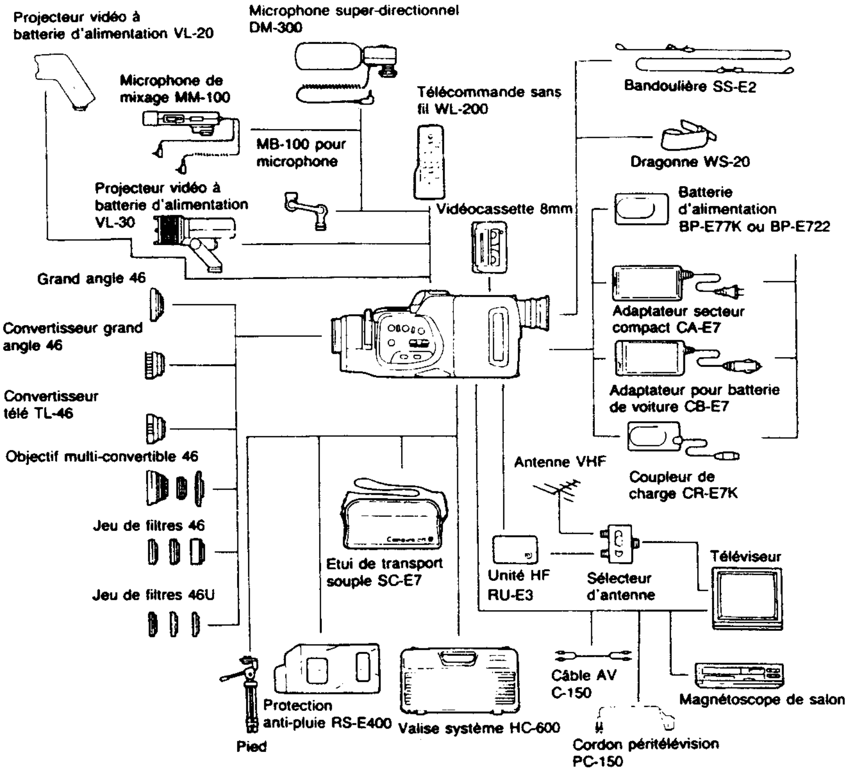

Projecteur vidéo à
batterie d'alimentation VL-20
Microphone super-directionnel
DM-300
Microphone de
mixage MM-100
Télécommande sans
fil WL-200
Bandoulière SS-E2
MB-100 pour
microphone
Dragonne WS-20
Projecteur vidéo à
batterie d'alimentation
VL-30
Vidéocassette 8mm
Batterie
d'alimentation
BP-E77K ou BP-E722
Grand angle 46
Convertisseur grand
angle 46
Adaptateur secteur
compact CA-E7
Convertisseur
télé TL-46
Adaptateur pour batterie
de voiture CB-E7
Objectif multi-convertible 46
Antenne VHF
Coupleur de
charge CR-E7K
Jeu de filtres 46
Etui de transport
souple SC-E7
Unité HF
RU-E3
Sélecteur
d'antenne
Téléviseur
Jeu de filtres 46U
Câble AV
C-150
Magnétoscope de salon
Protection
anti-pluie RS-E400
Valise système HC-600
Pied
Cordon péritélévision
PC-150

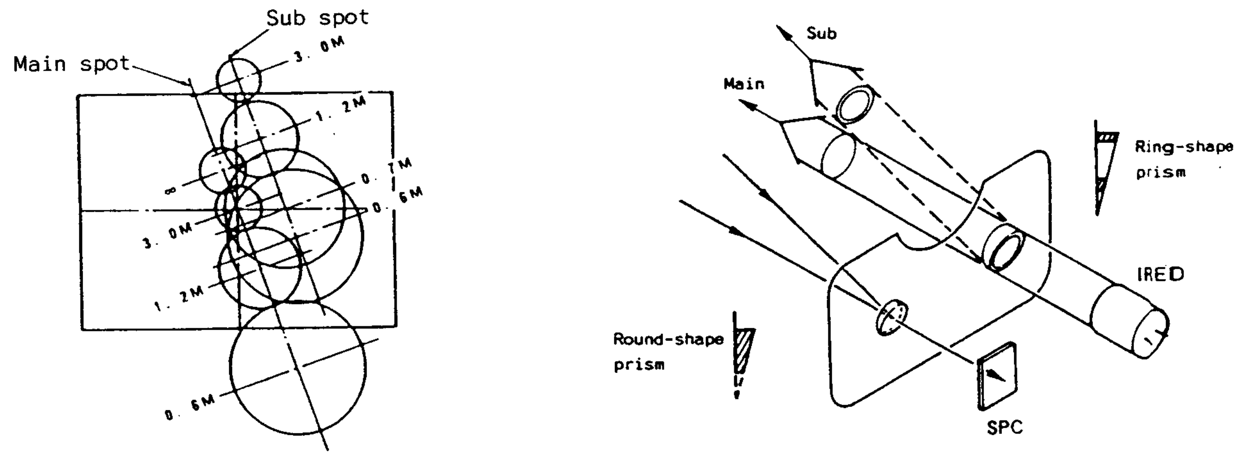
Fig. I-3-2

2. New Technologies

2-1 Lens section (advanced active auto focus system)

2-1-1 Dual spot distance measuring auto focus system

The AF system mounted on the E640E,F has a near infrared distance measuring system which has been used for other conventional Canon video camera and recorder systems. Moreover, especially for these models, a parallax correcting prism is added in a section of AF visible light cut-off filter. With this prism, two infrared beam spots (a main and a sub spots, see the Fig. I-4) can be utilized. Consequently, a tele-macro range recording between 0.6 m and 1.2 m where use of AF was not formerly possible is made true.



a) Twin—spot trajectory at telephoto end

b) Parallax correction prism

Fig. I-4

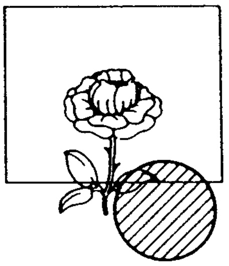
<Main spot effective recording range>

Power distribution: 90% (focusable: 9 m, 20%)
Parallax free : 3 m

This AF uses the externally measuring system. With this system, the parallax is increased as the recording distance exceeds 3 m. At the distance of 0.6 m, the center of the distance measuring area is outside the screen. (Fig. I-5a)

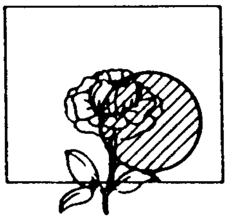
<Sub spot effective recording range>

To cover the distance which cannot be measured by using the main spot (especially a close distance), "sub spot" is developed. It has been designed with 10% the power of the main spot to prevent the AF measuring capability from decreasing. (Fig. I-5b)



Telephoto end at 0.6m

a) Main spot effective recording range



Telephoto end at 0.6m

b) Sub spot effective recording range

Fig. I-5

2-1-2 Multi functional AF mechanism

The AF system offers more than only a function of focusing the lens. It is a multi functional AF mechanism that includes the following: (1) auto frame function (2) focus memory function and (3) zoom memory function.

(1) Auto frame

This function is applied to set the focal distance automatically so that the size of the subject on the screen becomes constant even when the subject distance varies.
As shown in the Fig. I-6, in a close distance, the zooming is set to wide-angle, and in a long distance, it is set to telephoto angle.
The effective subject distance is between 1.2 m and 6 m. The system is programmed so that the upper half of the human torso is included within the screen constantly.
(If the angle is set constant as in conventional models, the figures on the screen at 6 m distance becomes one fifths of that at 1.2 m.)

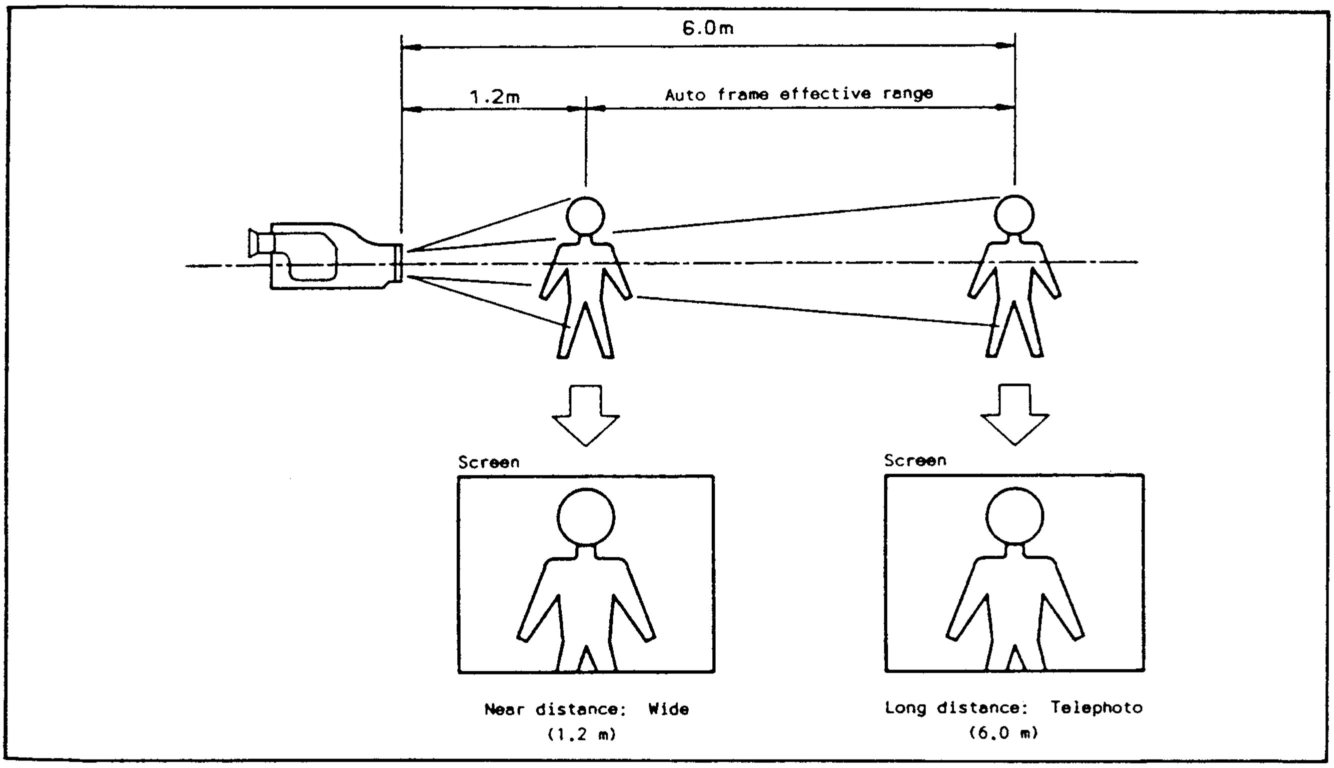


Fig. I-6

(2) Focus memory

This function is developed to record an arbitrary position on the distance ring between 1.2 m and infinity end. By pressing a button, the distance ring is automatically returned to the initial position, thus eliminating further AF operations.

Consequently, the following feature are come true.
1) Focusable on a subject outside the range-finding area (approx. the center of the screen)
2) 1.2 m or the infinity end is memorable, and it is usable for focus fading.
3) Focusable on two objects at different distances.

(3) Zoom memory

With this function, an arbitrary point on about the entire zoom ring can be recorded.
By pressing a button, the zoom ring is returned to the position memorized.

2-1-3 Optics

The Fig. I-7 shows the lens configuration of 8x power zoom lens used in the E640E,F. It is designed to obtain the superior resolution and the high-contrast in color reproduction.

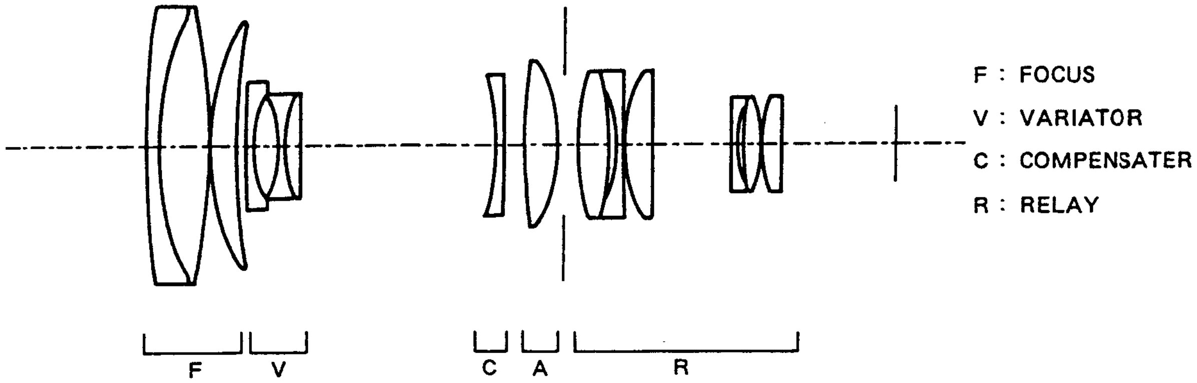


Fig. I-7

In addition to the lens arrangement used in the E708E,F and the E808E,F (8x zoom lens with wide-angle and telephoto macro facilities), this lens has the peripheral resolution that is 1.6 times the resolution of conventional models', to match the quality of Hi8 video standard having the horizontal resolution more than 400 TV lines.

2-2 Camera section

2-2-1 15-zone evaluation system

The 15-zone evaluation system has been developed to divide a screen into 15 zones by using a newly developed camera microcomputer. The purposes are as follows.

1)	AWB	True and natural color reproduction (in addition to the feature by one-axis correcting system conventionally used.)
2)	Automatic operation of auto-knee circuit	Operate automatically when the brightness level exceeds a certain level.
3)	Automatic backlight compensation	Correct the backlight when the strong backlight situations detected

As shown in the Fig. I-8, to gate sections from 1 through 4, R-Y, B-Y, Y_{IRIS} and Y_H are input respectively. At the gate sections, the gate pulses divide the screens into 15 zones which are gated in order one frame at a time.

The gate sections equalize the input signals, and apply them as data to the camera microcomputer after amplification. The microcomputer is reset by a V.D. pulse when it receives the data. (A peak is detectable at the gate 4)

The standard value of the input data (ex. 5600°K, 3200°K, and the corrected value for correction adjustment) is recorded in the E^2PROM in advance to eliminate the discrepancies among the individual equipments.

The control signals output from the microcomputer are R CONT, B CONT for white balance control, R GAIN PWM, B GAIN PWM, for color gain control and KNEE PWM for auto-knee control. These signals are output from the DA and PWM ports.

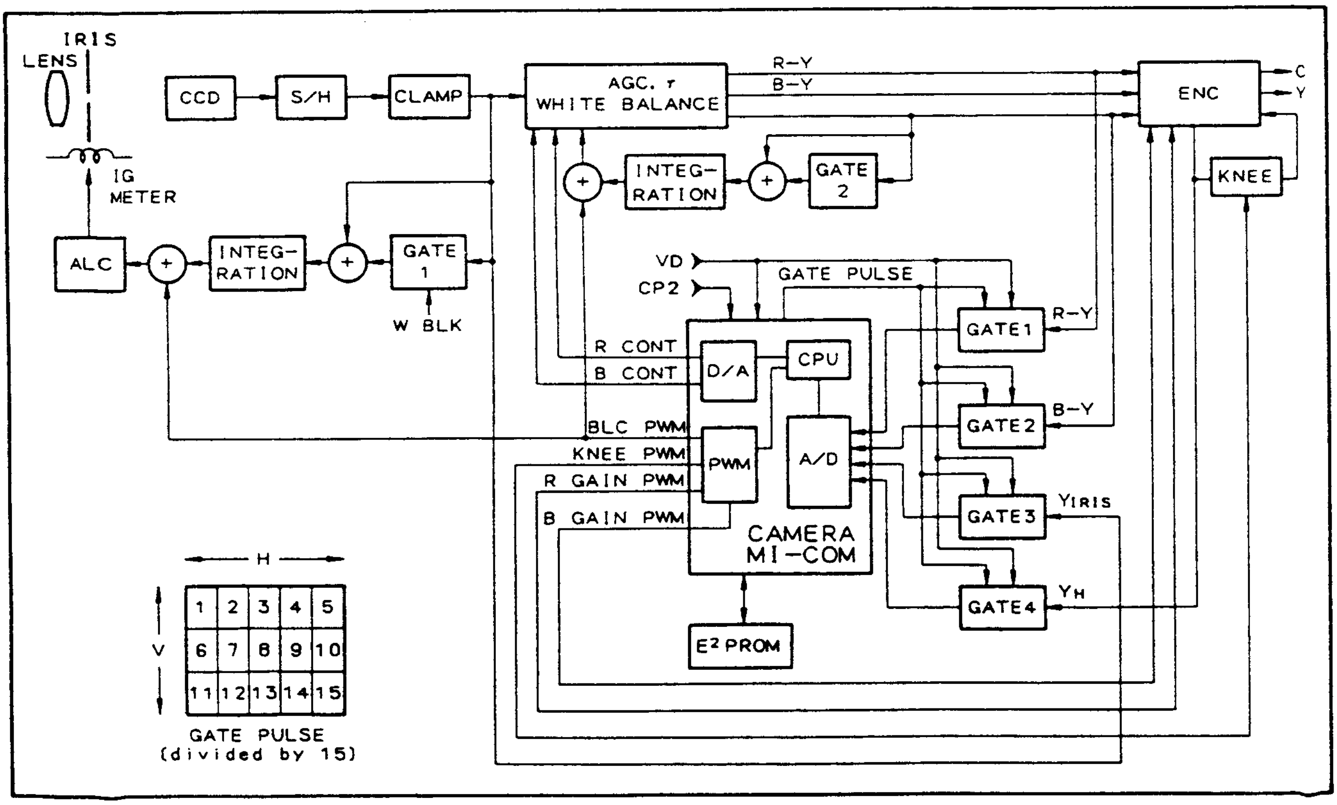
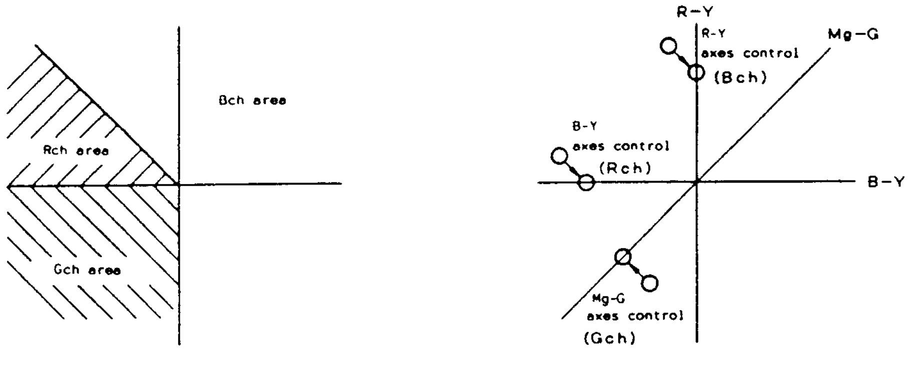

IRIS
LENS
IG
METER
ALC
+
INTEG-RATION
+
GATE 1
W BLK
CCD
S/H
CLAMP
AGC. γ
WHITE BALANCE
R-Y
B-Y
+
INTEG-RATION
+
GATE 2
ENC
C
Y
KNEE
VD
CP2
GATE PULSE
GATE1
R-Y
GATE2
B-Y
GATE3
YIRIS
GATE4
YH
R CONT
B CONT
D/A
CPU
BLC PWM
KNEE PWM
R GAIN PWM
B GAIN PWM
PWM
A/D
CAMERA MI-COM
E² PROM
H
V
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
GATE PULSE
(divided by 15)

Fig. I-8

2-2-2 Auto white balance

The Fig. I-9 shows a white balance control axes used in this system.

First, the average of color depth on a screen is computized to a bright dot. Next, a) the each bright dot is divided into three areas (Rch, Gch, Bch), then b) if it is in Rch area, for example, it is set to B-Y axis, and if it is in Gch area, it is set to Mg-G axis, etc. by one-axis correction system.
Actually, by studying the depth of color in 15-divided each gate, the necessary color depth is added for natural color balance.
With this system, a superior and more natural color reproduction with a various range of light source is realized. (Maximum necessary time for adjustment completion: approx. 20 seconds, however, immediately after power is turned on, the adjustment can be completed within approx. 4 seconds.)



a) Channel areas for individual white balance control

b) White balance control axes

Fig. I-9

2-2-3 Auto knee

The auto knee has been developed to improve the range and the color in high brightness as well as increase the Y dynamic range by using a nonlinear compression for input/output characteristic.
With this system, the Y_H data from a gate section 4 in the Fig. I-8 is used to carry out a control judgement for the knee point. The peak level is detected by using the data having level of 150% or more. (The gray scale center peak value is 100%.)
When a peak occupies 33% or more of the entire screen, (actually 5/15 of the entire screen), the knee point and the Y level is controlled.

<Actual control method >

When a peak occupies 33% or more of the screen,

1) the Y level is linear-compressed to 80% of normal.
2) the Y level only exceeding 50% is non-linear compressed.

The above two processes are carried out smoothly.
When the peak occupies 20% or less of the screen, the two processes are released, and the normal state is smoothly set. (Maximum necessary time: approx. 3 seconds)

The Fig. I-10 shows the IN/OUT characteristic of the above processes.

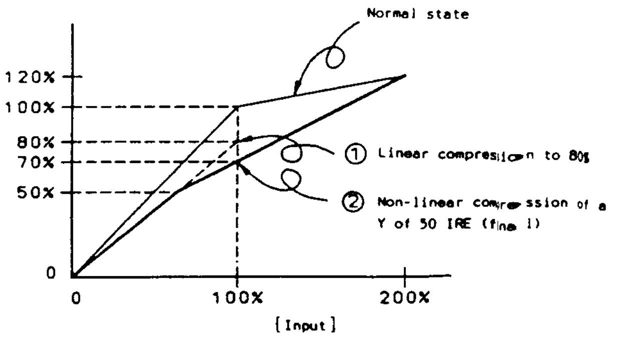


Fig. I-10

2-2-4 Auto BLC

This mechanism corrects the iris and the AGC level automatically when aiming at a subject with a bright background, to prevent dark areas.

In this system, in addition to the center weighted average light measuring system, the data of Y IRIS from a gate section 3 (Fig. I-8) is utilized for controlling the iris and the AGC level.

The Fig. I-11 shows the brightness level of the center area and that of the peripherals used in this system. To prevent the dark area caused by backlighting, this brightness level of the center area (W7, 8, 9, 12, 13 and 14) is controlled.

<Backlight judgement criteria >

En = birhgtness data of Wn (average of Y IRIS)

(1) Average brightness value for periphery = (E6+E10+E11+E5)/4
(2) Average brightness value for center area = (E7+E8+E9+E12+E13+E14)/6
(3) Brightness minimum value for center area = Smallest value among E7, E8, E9, E12, E13, E14

1. The ratio derived from (1) is 6 times or more of (3).
2. The both ratios of (1) and (2) are 20% or more of the normal state.
3. The difference between (1) and (3) is 40% or more of the normal state.

} → Back light compensation is necessary !

If the system judges the backlight compensation is required, the iris and the AGC levels are controlled so that (3) is set to 30% - 40% of the normal state. However, this is true up to maximum iris open value of 1.5 (3 times this at Y IRIS level) and a maximum AGC up value of 1.2 times. (maximum necessary time for adjustment completion: approx. 15 seconds.)

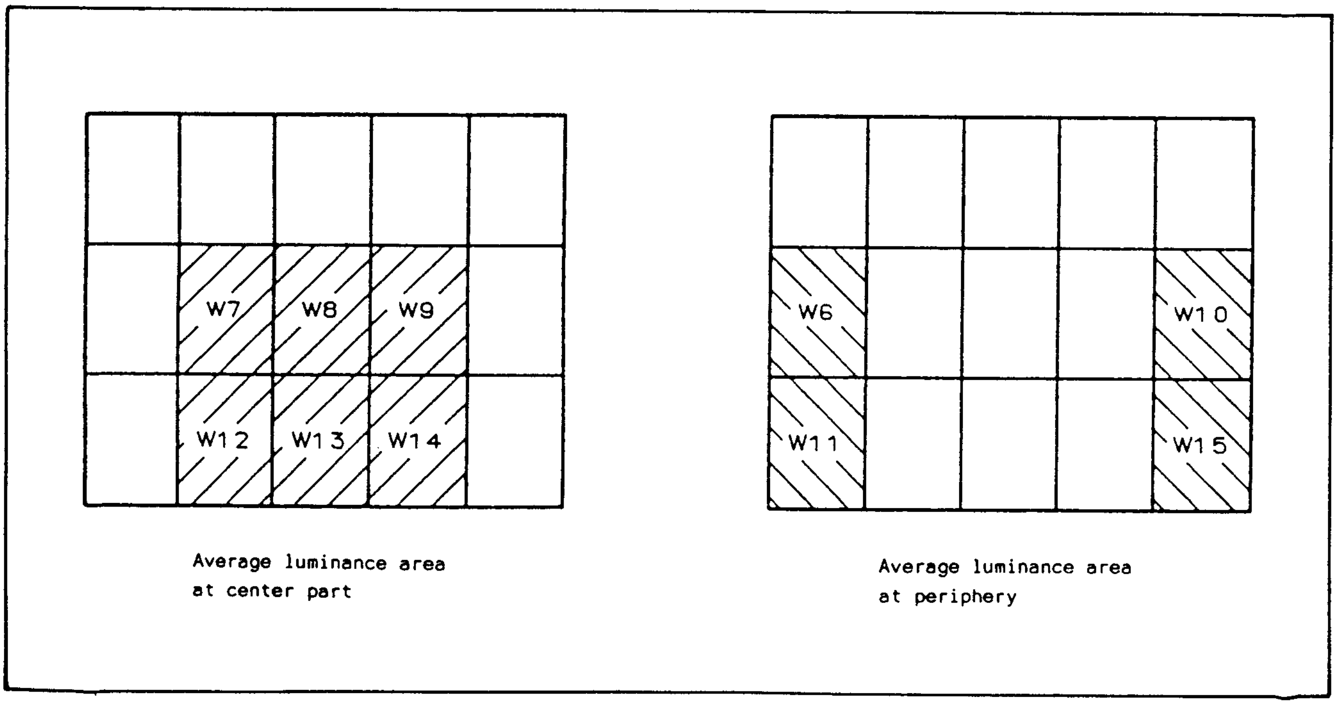


Fig. I-11

2-2-5 Digital title memory system

With this system, handwritten characters or illustrations can be stored in memory. These memorized information can be superimposed on the recording picture. Further, in addition to those systems, the variable memory threshold system which allows the color thickness adjustment is provided, and the characters or illustrations can be "see-through" (the recorded scene is visible through is provided the color). These features offer the much more possibilities for the creative image recording.

a) "See-through" mode

The Fig. I-12 (3) and (4) shows the super-imposing method conventionally used. The original image is hidden under the illustration, or vice versa.

However, with the "see-through" mode, the original image is visible underneath the illustrations in monotone. As shown in the Fig. I-12 (5) and (6), with this new super-imposition mode, the image varia- tions are greatly increased.

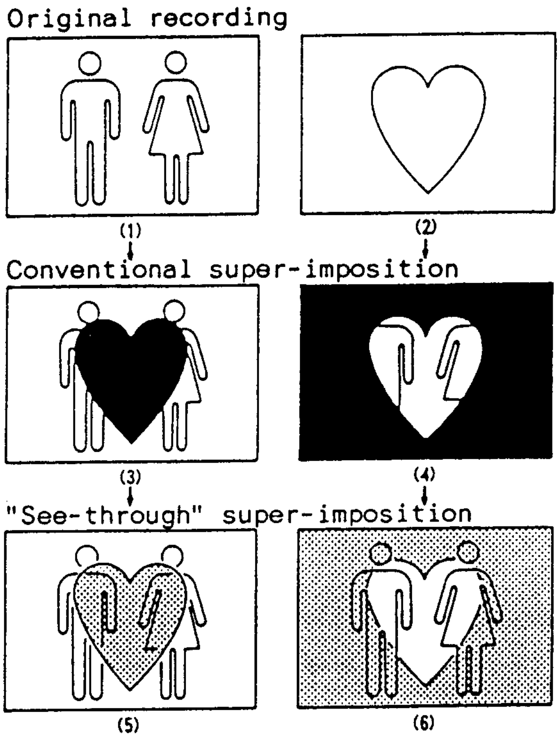
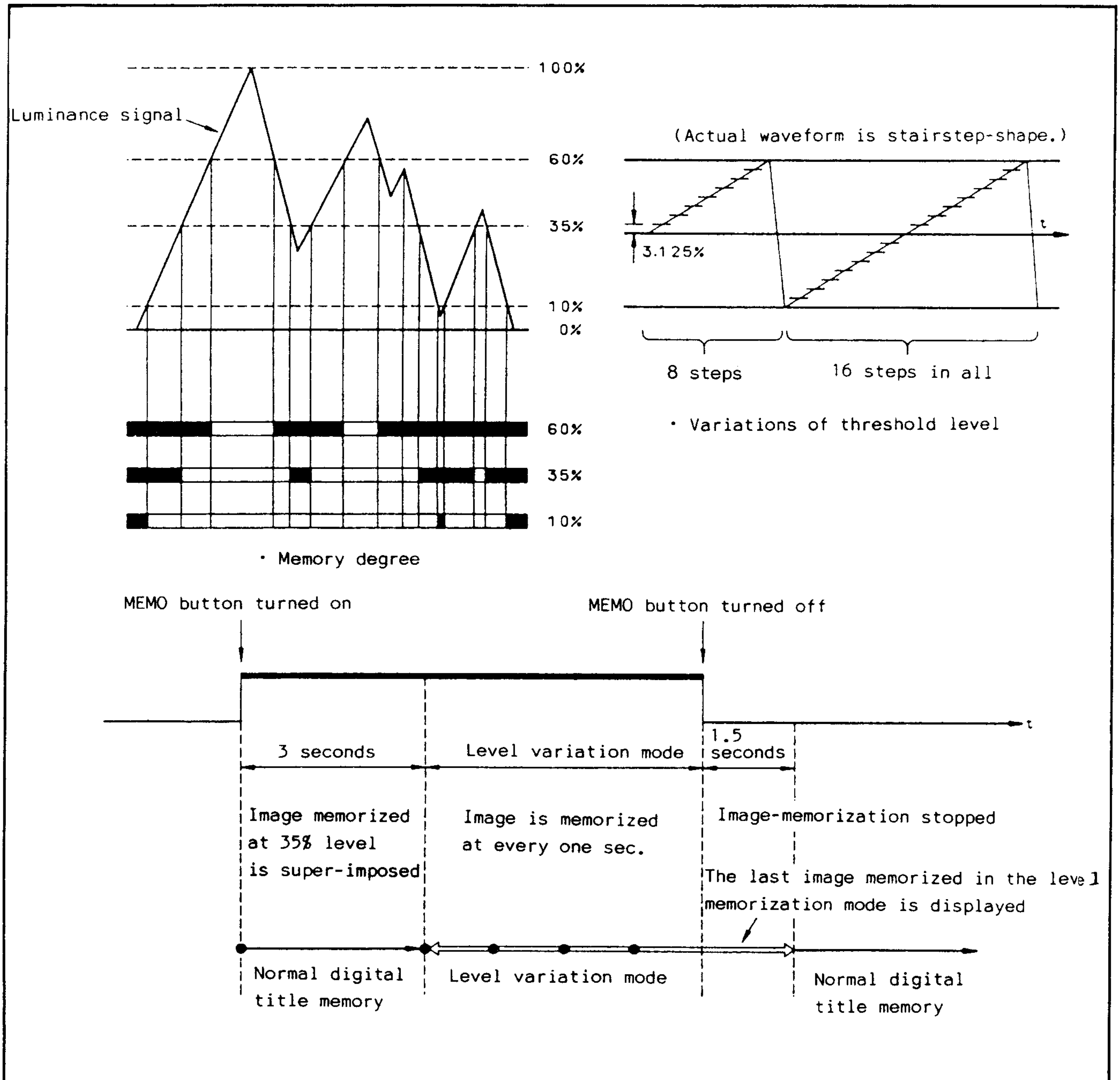


Fig. I-12

b) Variable threshold method for image thickness adjustment

In the digital title memory method, the video luminance signal is binarized into black and white at a certain level for memorizing the black portion. This method is effective when the image is in a strong contrast (e.g. black letters on a white paper). However, if the image has a weak contrast (e.g. colored titles, illustrations on magazines or posters), this effect cannot be obtained satisfactorily.

To obtain the clearer and the more variable pattern image even in such cases, this method adjust the color thickness level automatically from 10% to 60%, which is normally set at 35%, over 16 gradations. Thus, even the colored letters or illustrations on a poster etc. with a weak contrast can be utilized as a title effectively as the user desired.



100%
Luminance signal
60%
35%
10%
0%
60%
35%
10%
• Memory degree
(Actual waveform is stairstep-shape.)
3.125%
t
8 steps
16 steps in all
• Variations of threshold level
MEMO button turned on
MEMO button turned off
t
3 seconds
Level variation mode
1.5 seconds
Image memorized at 35% level is super-imposed
Image is memorized at every one sec.
Image-memorization stopped
The last image memorized in the level memorization mode is displayed
Normal digital title memory
Level variation mode
Normal digital title memory

● denotes the point of time that an image is taken into memory.

Fig. I-13

3. Circuit Description

3-1 Lens section

3-1-1 Auto focus system

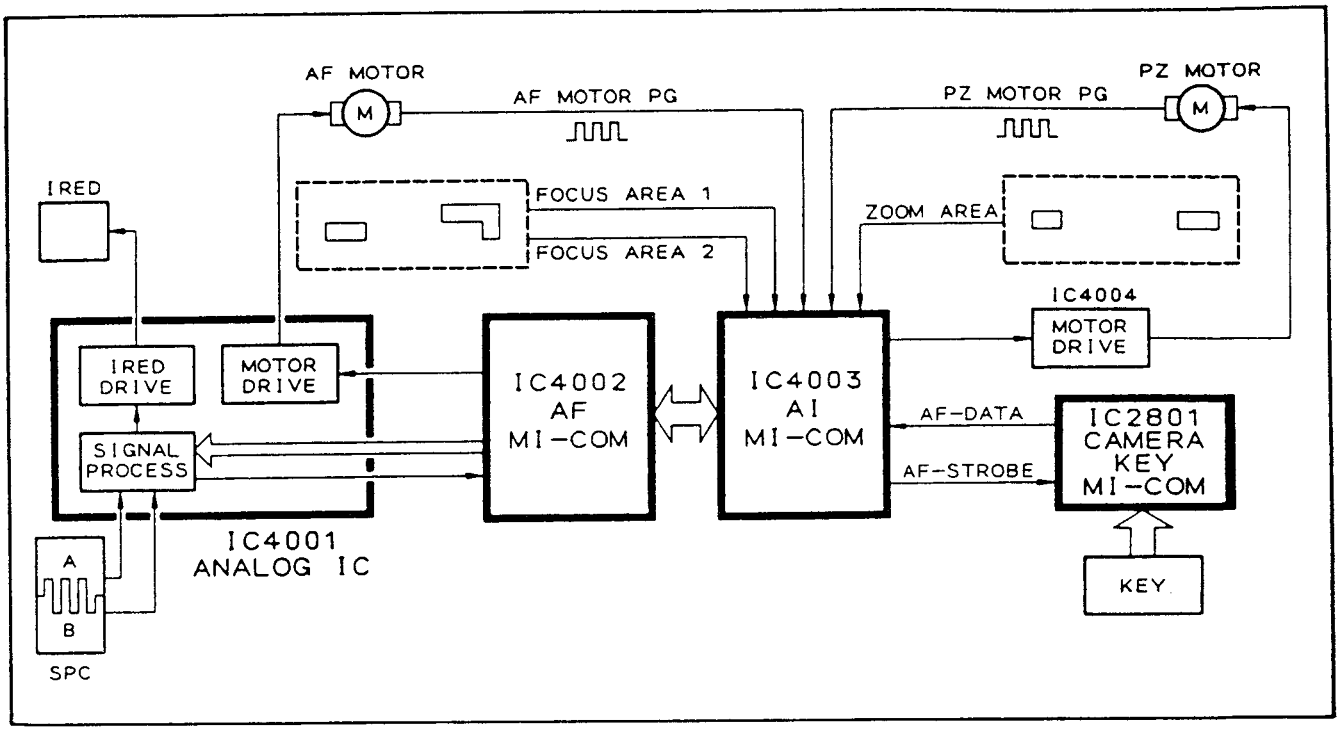

AF MOTOR
M
AF MOTOR PG
PZ MOTOR PG
PZ MOTOR
M
IRED
FOCUS AREA 1
FOCUS AREA 2
ZOOM AREA
IC4004
MOTOR DRIVE
IRED DRIVE
MOTOR DRIVE
SIGNAL PROCESS
IC4002
AF
MI-COM
IC4003
AI
MI-COM
AF-DATA
AF-STROBE
IC2801
CAMERA
KEY
MI-COM
KEY
IC4001
ANALOG IC
A
B
SPC

Fig. I-14

The Fig. I-14 shows an auto focus system used in the E640E,F.

1) Analog IC (IC4001)/AF microcomputer (IC4002)

In normal AF mode, these ICs function in the same manner as in the E80E,F, E808E,F, etc. By using a measured value of SPC output, an AF motor drive signal is fed to an analog IC from the AF microcomputer to drive the motor.

2) AF microcomputer (IC4002): Different functions from conventional IC

(1) AF ON/OFF signals are applied from AI microcomputer. It sets a focusing ring to 1.2 m distance in auto frame reset mode, to memory position in focus memory mode, and to stop position in manual setting mode.

(2) For AF motor driving, a drive rotation indicating signal is applied to the AI microcomputer.

3) AI microcmputer (IC4003): New technology

(1) To input AF function key signals, it communicates with the camera key microcomputer (IC2801).

(2) In manual setting, auto frame resetting and auto focus memory, it sends the AF ON/OFF signals and the drive rotation indicating signal. (stop signal in manual setting)

(3) For memory and resetting in each mode, while receiving a focusing ring area signal (2 bit) and a zoom ring area signal (1 bit), it counts down pulses fed by the rotation of AF/PZ motors. In focus memory, pulses are added/subtracted by the drive rotation indicating signal sent from the AF microcomptuer.

(4) It sends a motor driving signal to drive a zoom motor. (including power zoom)

3-1-2 Auto frame

The Fig. I-15 shows a relation among a focusing ring, a reflection plate (on a zoom ring), an AF and PG pulse of PZ motor.
The positions of focusing ring (1.2 m, 6.0 m, infinity end) is determined by using FOCUS AREA 1 and 2 (2 bit) signals. The AF motor PG signal outputs 322 pulses between 1.2 and 6.0 m. The position of zoom ring (focal distance 11.2 mm/telephoto end) is determined by the ZOOM AREA (1 bit) signal. The PZ motor PG signal outputs 322 pulses between 11.2 and 45.1 mm.

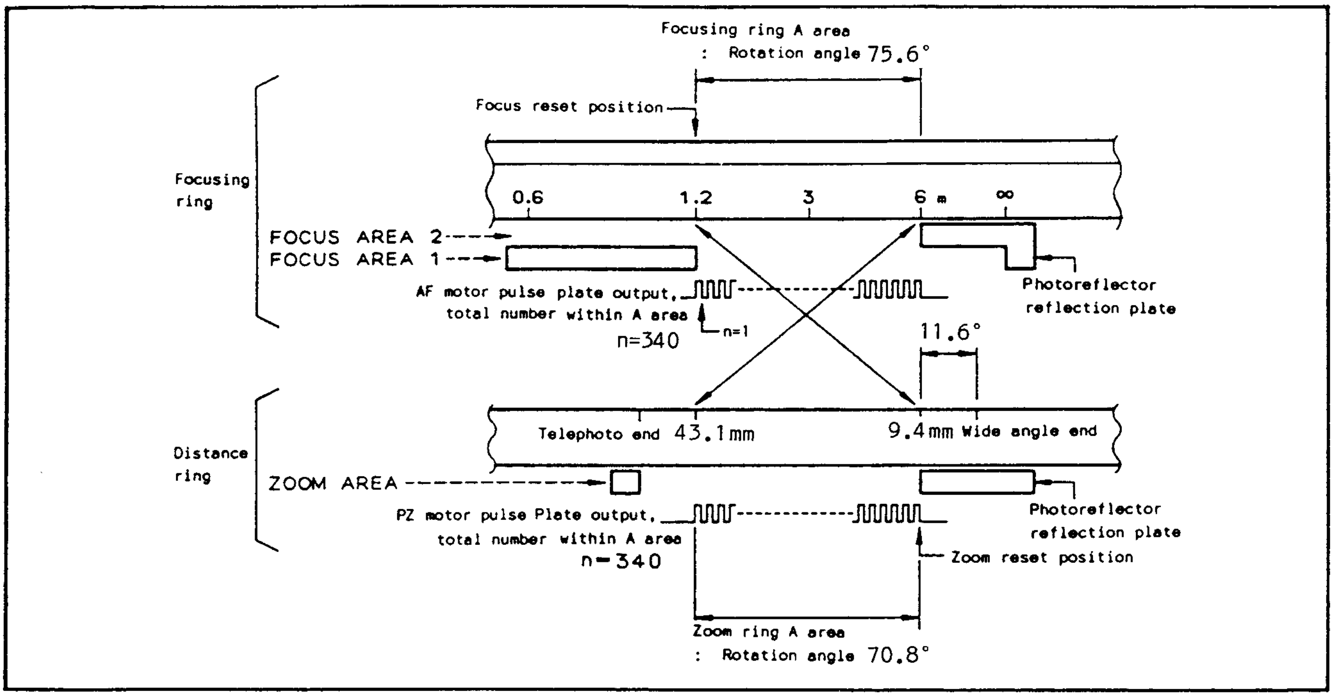

Focusing ring A area
: Rotation angle 75.6°
Focus reset position
Focusing ring
0.6
1.2
3
6 m
∞
FOCUS AREA 2
FOCUS AREA 1
AF motor pulse plate output, total number within A area n=340
n=1
Photoreflector reflection plate
11.6°
Distance ring
Telephoto end 43.1mm
9.4mm Wide angle end
ZOOM AREA
PZ motor pulse Plate output, total number within A area n=340
Photoreflector reflection plate
Zoom reset position
Zoom ring A area
: Rotation angle 70.8°

Fig. I-15

<Resetting operation with button ① >

To activate the auto frame mode, select the auto frame mode, and press the button ① for resetting. (Resetting means to set a focusing ring to 1.2 m and a zoom ring to 11.2 mm.)
At resetting, "577H" is input to a focus counter where the AF motor PG signal is counted, and also the same value "577H" is input to a zoom counter where the PZ motor PG is counted.
* "577H": figure in hexadecimal 3-digit

<Autoframing with button ② >

Next, the focusing ring starts the normal AF operation by the press of button ②. At this time, the focus counter is counting down the AF motor PG. (addition/subtraction of 557H, "+" for infinity end, "-" for close distance) The zoom motor is driven when the difference between values of focus and zoom counters exceeds 3 pulses. At this time, the zoom counter is counting down the PZ motor PG. ("+" for telephoto, "-" for wide) Then, it is stopped when the difference becomes ±3 or less. By repeating the above operations, the auto framing is carried out.

In other than the area A of focusing ring (0.6 m = 1.2 m and 6.0 m - infinity end), because the auto framing does not function, the zoom ring is stopped at 11.2 mm and 45.1 mm respectively so that the focus and the zoom counters stop the counting operation.

3-1-3 Focus memory

The focus memory is performed by using the data at focusing ring section in the auto framing function.
As explained in 3-1-2, a pulse plate is attached on the AF motor and output 322 pulses between 1.2 m and 6.0 m. These pulses are output not only within the distance range, but also output as long as the AF motor is rotated. That is, even in slip state when the focusing ring reaches to the infinity end or the closest end, these pulses are output. By utilizing this characteristic, the focus memory functions as explained below.

<Memorization with button ① >

To activate the focus memory mode, press the button ① in best focus state between 1.2 m and the infinity end. By pressing the button, "577H" is input to the focus counter to count down the AF motor PG ("+" for infinity end, "-" for close distance), and the unit enters the normal AF operation mode.
When a photo reflector detects the infinity end during pulse-counting, the microcomputer memorizes the focus counter value* at this time, and stops the pulse-counting. (*The value at this time is "M∞" hereafter.)
Then, the focusing ring starts to move toward the closest end, and immediately after exceeding the detecting range of infinity end, it inputs M∞ value to the focus counter to start the pulse counting again.
Also, when the distance of 1.2 m is detected by the photoreflector during the pulse-counting, the microcomputer memorized the focus counter value*, and stops the pulse counting. (* The value at this time is M1.2 hereafter.)
However, if the focusing ring is in 0.6 m - 1.2 m, the pulse counting is not functioned, and immediately after exceeding this range, M1.2 value is input to the focus counter.
The focusing counter values of M∞ and M1.2 are the first values after the button ① is pressed. The rewriting of these values are not made even when the focusing ring exceeds the positions of each value. Owing to this, the pulse-counting error, which may be caused by the rotation indicating signals, etc. which constantly changes, can be avoided.

<Focus memory with button ② >

Next, when the button ② is pressed, the focusing ring is set forcibly toward the direction where the focus counter value becomes "577H" comparing the actual value on the focus counter.

3-1-4 Zoom memory

The zoom memory is performed by using the data at zoom ring section in the auto framing function.
The principle of zoom memory is similar to that of focus memory.
The effective range f is 11.2 mm to telephoto end. When the button ① is pressed within this range, "577H" is input to the zoom counter. Then the PZ motor PG is counted down by the zoom counter ("+" for telephoto, "-" for wide). When the reflector detects the telephoto end and the position of f=11.2 mm, the counter value (MT or M11.2) at this time is memorized and the pulse-counting is stopped. Then the zoom ring starts, and immediately after exceeding the detected range of telephoto end and f=11.2 mm, the values of MT and M11.2 are input. As same as in the focus memory, the values of MT and M11.2 mm are the first values which is determined after the button ① is pressed.

* When there is registration in the memory at positions between f=11.2 mm and the wide angle end, the signal is received; however, as this is in the range for the photoreflector reflecting section, there will be no pulse-counting. Thus, memory in this range is not a constant. In terms of operation, once this area is left it becomes the 9.4 mm position. However, since the change in the focal distance is limited within this range, this should pose no problems in actual use.

3-2 Camera section

3-2-1 Power supply circuit

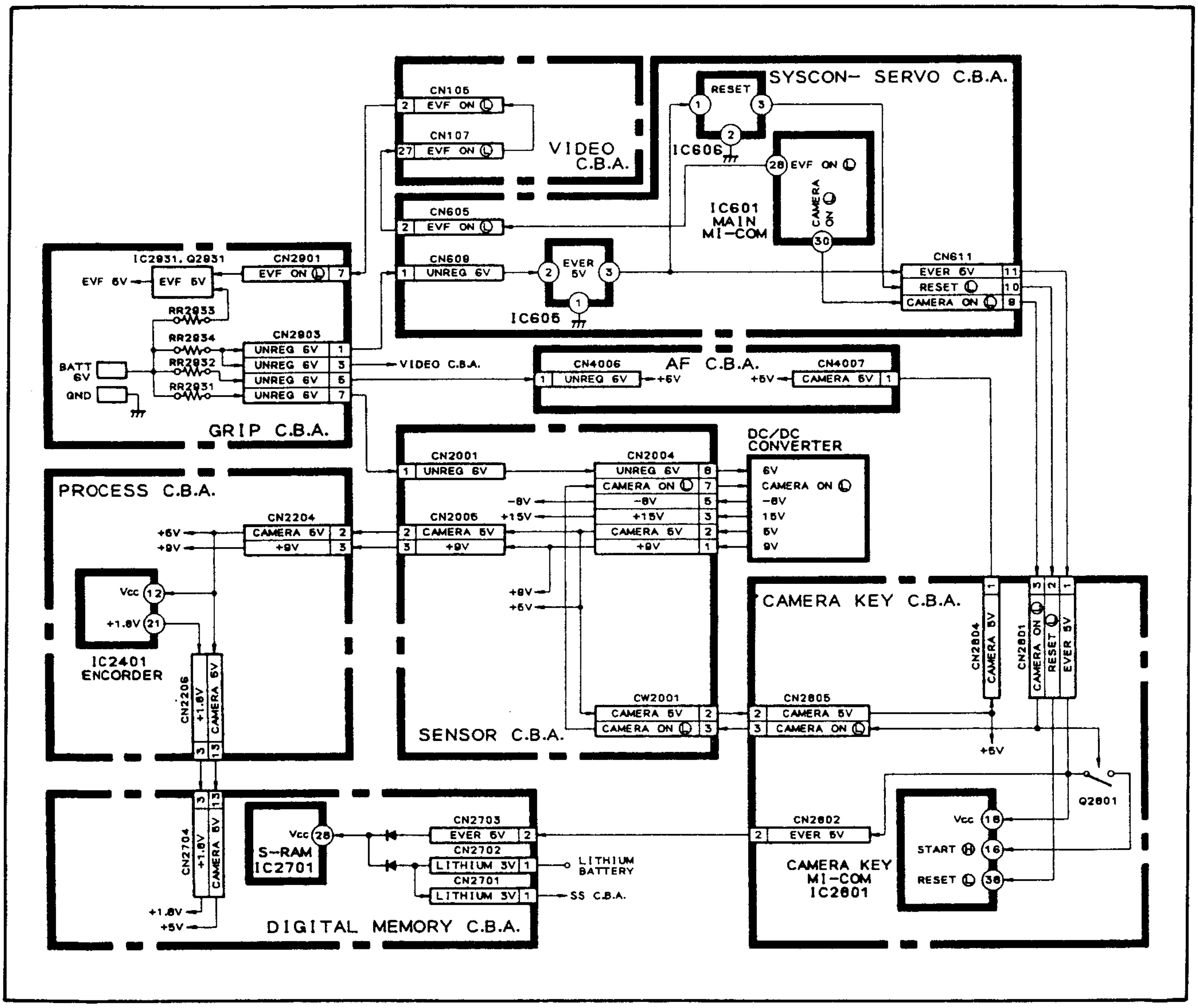

VIDEO C.B.A.
CN105
2 EVF ON Ⓛ
CN107
27 EVF ON Ⓛ
SYSCON- SERVO C.B.A.
RESET
IC606
IC601 MAIN MI-COM
28 EVF ON Ⓛ
CAMERA ON Ⓛ
30
CN605
2 EVF ON Ⓛ
CN609
1 UNREG 6V
EVER 5V
IC605
CN611
EVER 5V 11
RESET Ⓛ 10
CAMERA ON Ⓛ 9
GRIP C.B.A.
IC2931, Q2931
EVF 5V
CN2901
EVF ON Ⓛ 7
RR2933
RR2934
RR2932
RR2931
CN2903
UNREG 6V 1
UNREG 6V 3
UNREG 6V 5
UNREG 6V 7
BATT 6V
GND
VIDEO C.B.A.
AF C.B.A.
CN4006
1 UNREG 6V
+6V
CN4007
+5V
CAMERA 5V 1
PROCESS C.B.A.
CN2204
+5V
+9V
CAMERA 5V 2
+9V 3
Vcc 12
+1.8V 21
IC2401 ENCORDER
CN2206
+1.8V
CAMERA 5V
3
13
SENSOR C.B.A.
CN2001
1 UNREG 6V
CN2006
2 CAMERA 5V
3 +9V
-8V
+15V
+9V
+5V
CN2004
UNREG 6V 8
CAMERA ON Ⓛ 7
-8V 5
+15V 3
CAMERA 5V 2
+9V 1
CW2001
CAMERA 5V 2
CAMERA ON Ⓛ 3
DC/DC CONVERTER
6V
CAMERA ON Ⓛ
-8V
15V
5V
9V
CAMERA KEY C.B.A.
CN2804
CAMERA 5V
CN2801
CAMERA ON Ⓛ
RESET Ⓛ
EVER 5V
CN2805
2 CAMERA 5V
3 CAMERA ON Ⓛ
+5V
Q2801
CN2802
2 EVER 5V
CAMERA KEY MI-COM IC2801
Vcc 18
START Ⓗ 16
RESET Ⓛ 38
DIGITAL MEMORY C.B.A.
CN2704
+1.8V
CAMERA 5V
S-RAM IC2701
Vcc 28
CN2703
EVER 5V 2
CN2702
LITHIUM 3V 1
LITHIUM BATTERY
CN2701
LITHIUM 3V 1
SS C.B.A.
+1.8V
+5V

Fig. I-16

(1) Kinds of power source

The Fig. I-16 shows a schematic diagram of power supply circuit in the camera section. +6V from a battery terminal is supplied to each C.B.A. as the UNREG 6V via protective elements (RR2931, RR2932, RR2933, RR2934) on the GRIP C.B.A.

1) CAMERA 5V (9V, 15V, -8V)

This voltage, which is used as a main power source for the camera section, is generated at the DC/DC converter.
The CAMERA ON Ⓛ signal output from pin 30 of main microcomputer IC606 turns on the DC/DC converter to output CAMERA 5V, and 9V, 15V and -8V for CCD drive.

2) EVF 5V (GRIP C.B.A.)

This voltage is generated at the regulator, which consists of IC2931 and Q2931 by using the UNREG 6V.
The EVF ON Ⓛ signal output from pin 28 of IC606 turns on the regulator to output the EVF 5V.

3) EVER 5V

This voltage is generated from the UNREG 6V at IC605 of SYSCON-SERVO C.B.A. for IC2701 of DIGITAL MEMORY C.B.A. and the camera key microcomputer IC2801.
This voltage is constantly output from IC605 for backup the title and date as long as the UNREG 6V is supplied.

4) +1.8V

This voltage is generated from the CAMERA 5V at IC2401 of the PROCESS C.B.A. then output from pin 21.
This votlage is used as a reference voltage for the PROCESS C.B.A. and the DIGITAL MEMORY C.B.A.

5) Lithium 3V

This voltage, which is supplied from a lithium battery when the power source (+6V) is disconnected, is used as a backup voltage for IC2701 (digital title memory), and also is supplied to the SYSCON-SERVO C.B.A. as a backup voltage for the QD microcomputer (date).

(2) Camera key microcomputer IC2801 drive sequence

When the power source (+6V) is connected, the EVER 5V is supplied to pin 18 of camera key micrcomputer IC2801. At this time, the RESET Ⓛ signal that lags behind the leading edge of EVER 5V is input from the RESET IC606 to pin 38 of IC2801, and immediately after the resetting, it enters the sleep mode.
Then, the Q2801 is turned on by the CAMERA ON Ⓛ signal from the main microcomputer IC506, and pin 16 goes high to drive the IC2801.

3-2-2 CCD drive circuit

The CCD imaging device (1/2 inch size, with 380,000 pixels) used for the E640E,F does not have an interchangeability with the CCDs used for other conventional models. (To reduce a dark current, the drive voltage is changed.)
However, the circuit configuration is similar to that for A1E,F, etc.

3-2-3 Processing circuit

The PROCESS IC consists of IC2201 (AN2153NS) for luminance and color differential signal processings and IC2401 (AN2253FAP). The basic principle is the same as the E80E,F's except the back light compensation, the knee operation and the AWB control are controlled by the camera microcomputer IC2601.

(1) AWB circuit

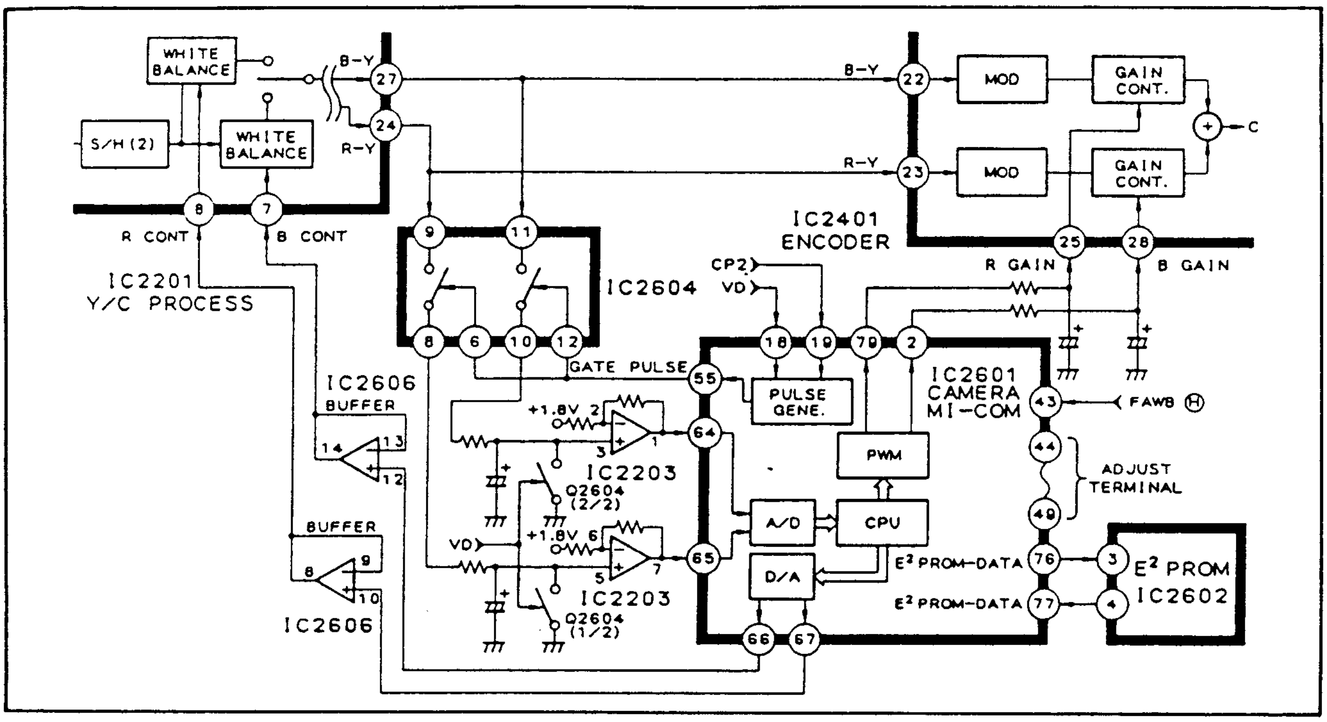

WHITE BALANCE
S/H (2)
WHITE BALANCE
B-Y
R-Y
27
24
8
7
R CONT
B CONT
IC2201
Y/C PROCESS
9
11
8
6
10
12
IC2604
GATE PULSE
IC2606
BUFFER
14
13
12
BUFFER
8
9
10
IC2606
+1.8V
2
3
1
IC2203
Q2604 (2/2)
VD
+1.8V
6
5
7
IC2203
Q2604 (1/2)
B-Y
22
R-Y
23
MOD
MOD
GAIN CONT.
GAIN CONT.
C
IC2401
ENCODER
25
28
R GAIN
B GAIN
CP2
VD
18
19
79
2
55
64
65
66
67
PULSE GENE.
PWM
A/D
CPU
D/A
IC2601
CAMERA MI-COM
43
FAWB Ⓗ
44
48
ADJUST TERMINAL
E² PROM-DATA
E² PROM-DATA
76
77
3
4
E² PROM
IC2602

Fig. I-17

The R-Y and the B-Y color differential signals output from IC2201 divides one screen into 15 zones. (As shown in the Fig. I-18, the input to the gate are gated in order one frame at a time.)
The color differential signal from IC2604 is equalized by the resistor and the capacitor. At this time the capacitor is discharged by Q2604 by every one field for resetting. Then, the color differential signal is amplified and input to the camera microcomputer.

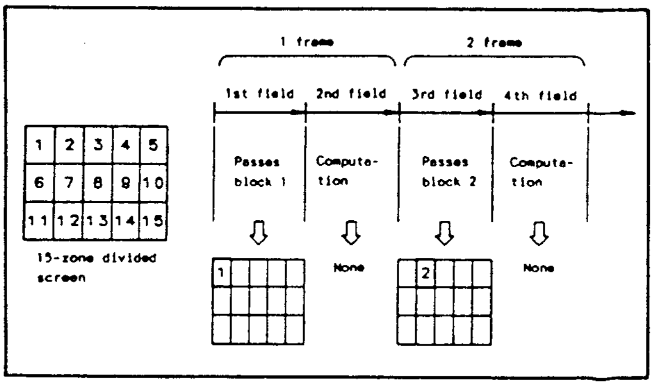

1 frame
2 frame
1st field
2nd field
3rd field
4th field
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
15-zone divided screen
Passes block 1
Computation
Passes block 2
Computation
1
None
2
None

Fig. I-18

In the camera microcomputer, it is computized by using the data (memorized by E^{2}PROM, IC2602). Eventually, using the B-CONT and R-CONT DC voltage signals appearing from pins 66 and 67, gain amplification is controlled to achieve accurate white balance.

The VR for color balance adjustment (gain control amplifier adjuster) ofIC2401 provided on the conventional models are absorbed into the camera microcomputer. From pins 2 and 79, B-GAIN and R-GAIN control signals are output.

For the R-GAIN and B-GAIN signals, as same as in the conventional models, the matrix correction by the color temperature is performed.

(2) Auto knee circuit

The Y_H signal output from pin 16 of IC2401 is fed to the gate section to be divided into 15 zones in IC2604 by using the gate pulses. The Y_H signal output from IC2604 is reset by VD by 1 field, then applied to the camera microcomputer via IC2203 (BUFFER).

In the camera microcomputer, the signal processings explained in the new technology section are carried out.
From pin 78, the PWM signal for the knee control is output. Then, it controls the Q2420, 2406 and 2407 after integration to give a knee effect on the luminance signal.
The 80% linear compression is made by Q2420, and the non-linear compression is performed by Q2406 and 2407.

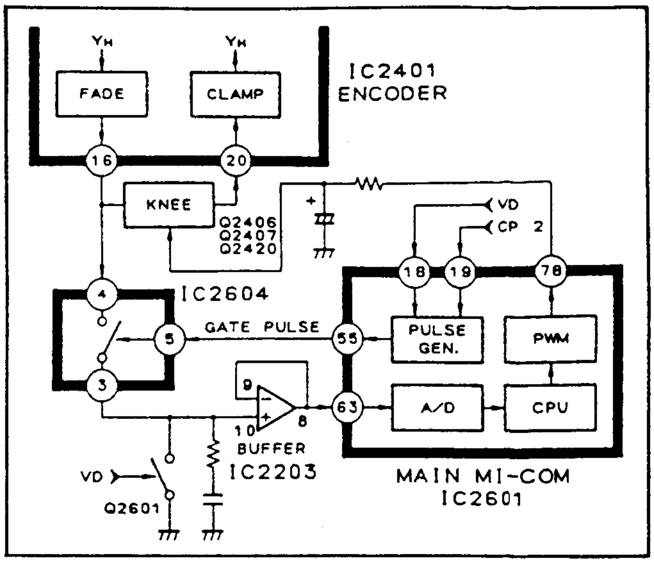

YH
YH
FADE
CLAMP
IC2401
ENCODER
16
20
KNEE
Q2406
Q2407
Q2420
VD
CP 2
18
19
78
4
IC2604
5
GATE PULSE
55
PULSE GEN.
PWM
3
9
8
10
BUFFER
IC2203
63
A/D
CPU
VD
Q2601
MAIN MI-COM
IC2601

Fig. I-19

(3) Auto BLC circuit

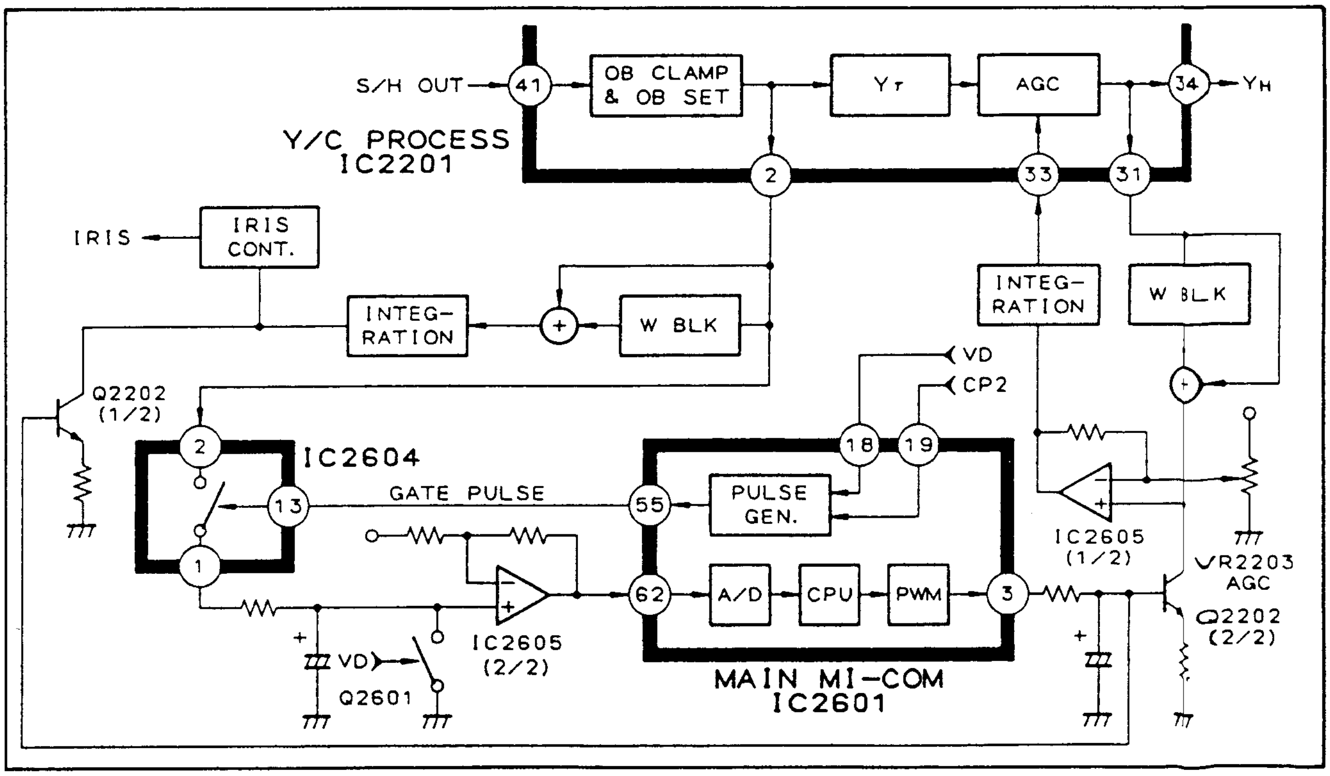

S/H OUT
41
OB CLAMP & OB SET
Yr
AGC
34
YH
Y/C PROCESS
IC2201
2
33
31
IRIS
IRIS CONT.
INTEG-RATION
+
W BLK
INTEG-RATION
W BLK
VD
CP2
+
Q2202 (1/2)
2
IC2604
13
GATE PULSE
1
18
19
55
PULSE GEN.
62
A/D
CPU
PWM
3
IC2605 (1/2)
VR2203 AGC
Q2202 (2/2)
IC2605 (2/2)
VD
Q2601
MAIN MI-COM
IC2601

Fig. I-20

For the auto BLC control, the Y-IRIS signal from pin 2 of IC2201 is used. After output from pin 2 of IC2201, it is divided into fifteen on screen by using the gate pulse in IC2604. After integration (resetting is made by VD in every 1 field), it is amplified in IC2605 and input to the camera microcomputer.
When the back light compensation is required, the PWM control signal is output. The control signal output from pin 3 is applied to Q2202 to decrease the level of video signal at AGC and iris control circuit. In this manner, the iris is opened to decrease the AGC level for back light compensation.

3-2-4 Digital title memory circuit

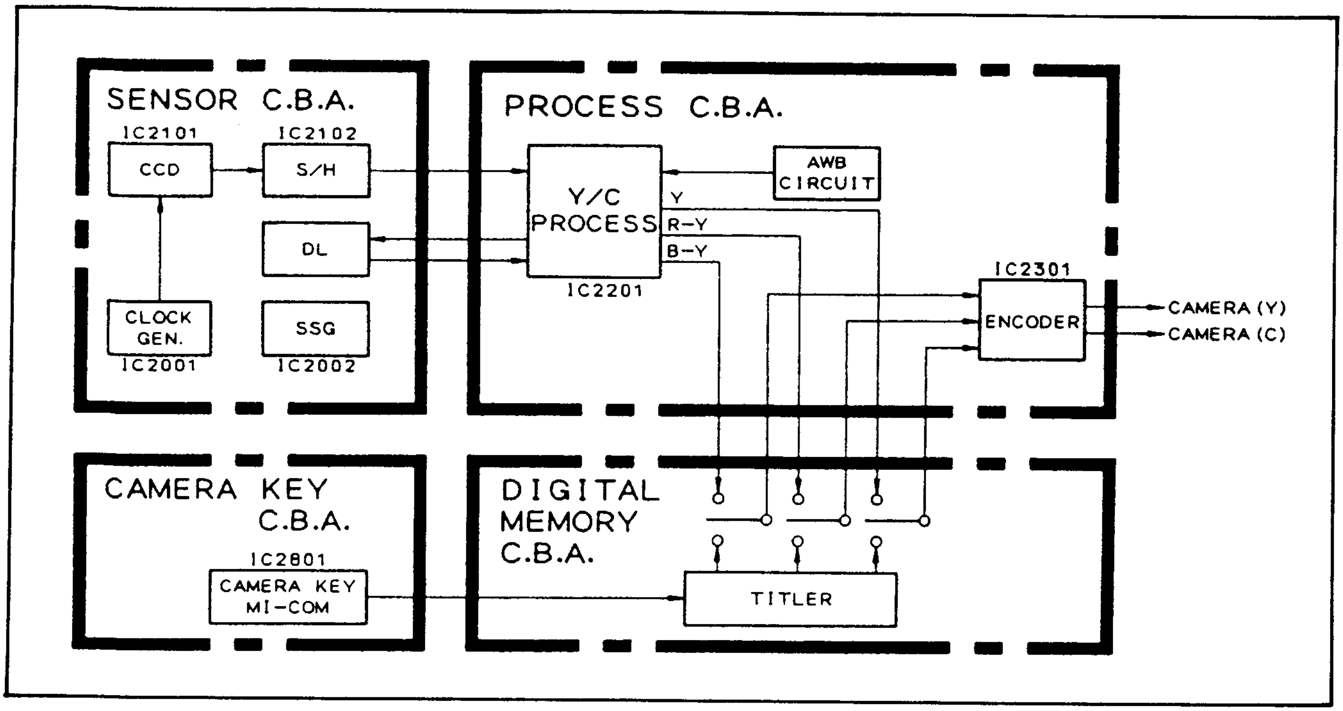

SENSOR C.B.A.
IC2101
IC2102
CCD
S/H
DL
CLOCK GEN.
SSG
IC2001
IC2002
PROCESS C.B.A.
Y/C PROCESS
IC2201
AWB CIRCUIT
Y
R-Y
B-Y
IC2301
ENCODER
CAMERA (Y)
CAMERA (C)
CAMERA KEY C.B.A.
IC2801
CAMERA KEY MI-COM
DIGITAL MEMORY C.B.A.
TITLER

Fig. I-21

The Fig. I-21 shows a processing circuit in the camera section.
The basic principle is the same as the E80E,F's except the digital title memory circuit which is added to insert the digital title signal into the luminance, R-Y and B-Y signals while signal processing. The digital title memory circuit is controlled by the camera key microcomputer IC2801.

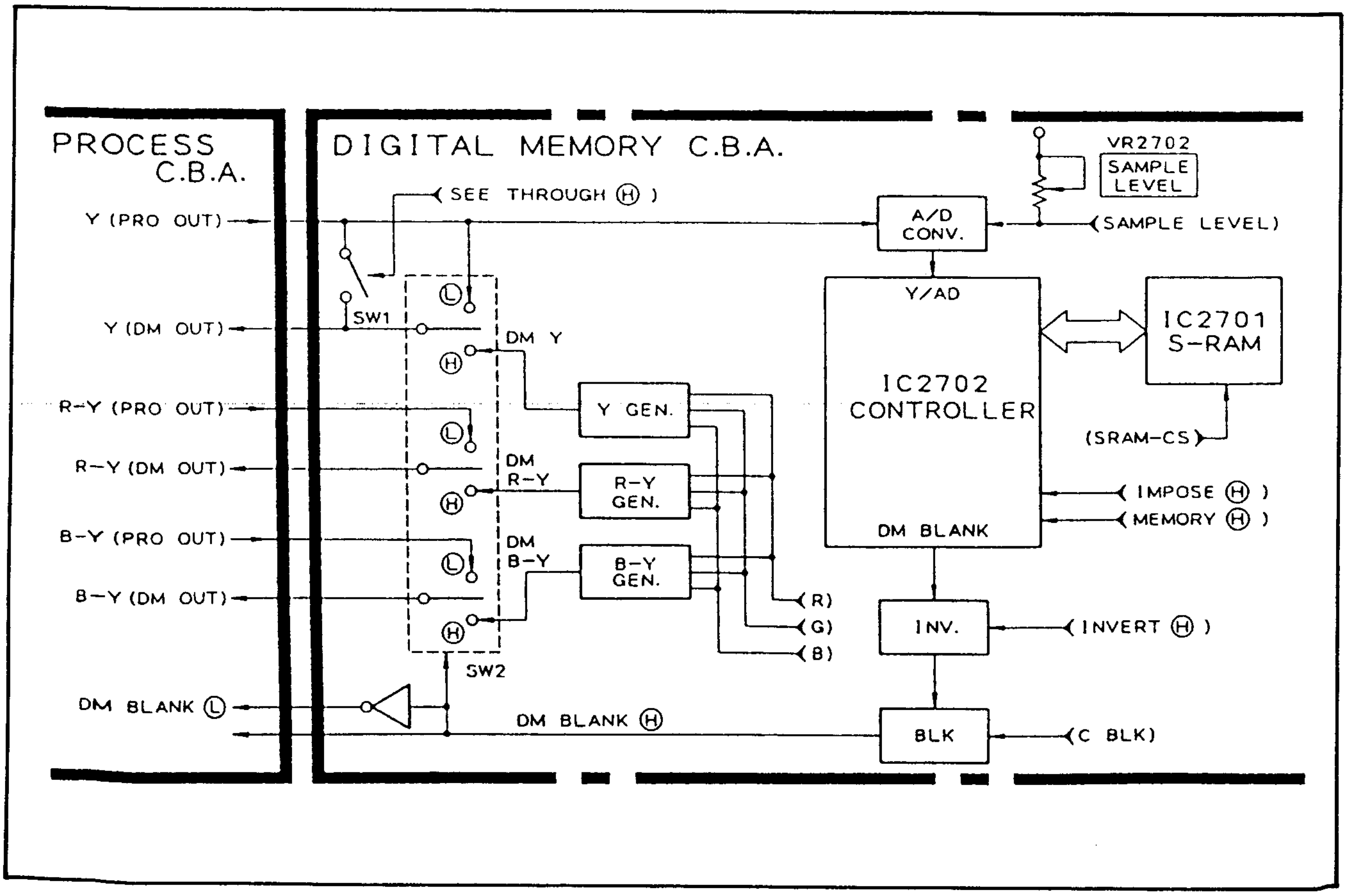

PROCESS C.B.A.
DIGITAL MEMORY C.B.A.
Y (PRO OUT)
Y (DM OUT)
R-Y (PRO OUT)
R-Y (DM OUT)
B-Y (PRO OUT)
B-Y (DM OUT)
DM BLANK Ⓛ
SEE THROUGH Ⓗ
SW1
SW2
Ⓛ
Ⓗ
DM Y
DM R-Y
DM B-Y
Y GEN.
R-Y GEN.
B-Y GEN.
R)
G)
B)
DM BLANK Ⓗ
A/D CONV.
VR2702
SAMPLE LEVEL
(SAMPLE LEVEL)
Y/AD
IC2702 CONTROLLER
DM BLANK
IC2701 S-RAM
(SRAM-CS)
IMPOSE Ⓗ
MEMORY Ⓗ
INV.
INVERT Ⓗ
BLK
C BLK)

Fig. I-22

The followings are the explanation of digital title memory circuit operation (refer to Fig. I-22).

1) A/D converter

This converter binarizes the luminance signal (Y PRO OUT) output from the PROCESS C.B.A.
In the normal state, the luminance signal is binarized at approximately 35% thickness comparing with the normal level. During the thickness adjustment mode, the binarization is made between 10% and 60% (approx.) by the SAMPLE LEVEL signal from the microcomputer.

2) Controller IC2702

The binarized data at the A/D converter is written to the SRAM IC2701 by this IC. Also, to superimpose the digital title, the binarized data is read out by this IC.

The superimposition is made by switching SW2 by using the DM BLANK signal. (In the reverse mode the DM BLANK signal is inverted by the INVERT Ⓗ signal.)

To release the functions of the fading and the chroma suppression at low illumination in the digital title portion, the DM BLANK Ⓗ and the DM BLANK Ⓛ signals are sent back to the PROCESS C.B.A.

3) SRAM (IC2701)

This IC is a random access memory which memorizes the digital title. When the digital title memory mode is set, the SRAM-CS goes high to communicate with the controller IC2702.
This IC is backed-up by the LITHIUM 3V from a lithium battery.

The color data for the digital title is not memorized in this IC. (It is backed-up on the section of camera key microcomputer.)

The color is reset to white when the power source (6V) is disconnected.

4) Y, R-Y, B-Y generators

These generators generates the digital title signals (DM Y, DM R-Y, DM B-Y) corresponding to the signals R, G and B output from the camera key microcomputer.

5) See-through switch 1

In the see-through mode, to overlap the digital title signal on the luminance signal, this switch is constantly turned on.

3-2-5 Terminal functions of camera key microcomputer (IC2801)

Table I-1(1/2) Terminal functions of camera key microcomputer (IC2801)

NC: Not connected

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>SAMPLE FADE Ⓗ</td><td>O</td><td>To judge the memorized level easily in the image thickness adjustment mode (for digital title memory function), the back scene is made white (fading).
Goes high at sample-fading.</td></tr>
<tr><td>2</td><td>MEMORY Ⓗ</td><td>O</td><td>Goes high at memorizing the digital title.</td></tr>
<tr><td>3</td><td>INVERT Ⓗ</td><td>O</td><td>Goes high at reversing the digital title.</td></tr>
<tr><td>4</td><td>R</td><td rowspan="3">O</td><td rowspan="3">Color control signal (for digital title memory function)
<table>
<tr><th></th><th>W</th><th>R</th><th>G</th><th>B</th><th>Ye</th><th>Cy</th><th>Mg</th><th>Black</th></tr>
<tr><td>R</td><td>H</td><td>H</td><td>L</td><td>L</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>G</td><td>H</td><td>L</td><td>H</td><td>L</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
<tr><td>B</td><td>H</td><td>L</td><td>L</td><td>H</td><td>L</td><td>H</td><td>H</td><td>L</td></tr>
</table></td></tr>
<tr><td>5</td><td>G</td></tr>
<tr><td>6</td><td>B</td></tr>
<tr><td>7</td><td>SAMPLE LEV. (1)</td><td rowspan="4">O</td><td rowspan="4">Reference outputs for digital memory threshold level.
Separates the threshold level into 16 steps by using 4-bit combination.
Adjust the memorizing level between 10 and 60%.</td></tr>
<tr><td>8</td><td>SAMPLE LEV. (2)</td></tr>
<tr><td>9</td><td>SAMPLE LEV. (3)</td></tr>
<tr><td>10</td><td>SAMPLE LEV. (4)</td></tr>
<tr><td>11</td><td>NC</td><td>-</td><td>-</td></tr>
<tr><td>12</td><td>SEE THROUGH Ⓗ</td><td>O</td><td>Goes high in SEE THROUGH mode.</td></tr>
<tr><td>13</td><td>SHUTTER 1</td><td rowspan="3">O</td><td rowspan="3">Electronic shutter speed control signal
<table>
<tr><th></th><th>1/50</th><th>1/250</th><th>1/500</th><th>1/1000</th><th>1/2000</th></tr>
<tr><td>SHUTTER 1</td><td>L</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>SHUTTER 2</td><td>L</td><td>L</td><td>H</td><td>H</td><td>L</td></tr>
<tr><td>SHUTTER 3</td><td>L</td><td>L</td><td>L</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>14</td><td>SHUTTER 2</td></tr>
<tr><td>15</td><td>SHUTTER 3</td></tr>
<tr><td>16</td><td>START Ⓗ</td><td>I</td><td>Sleep mode releasing signal. Goes high at releasing.</td></tr>
<tr><td>17</td><td>NC</td><td>-</td><td>-</td></tr>
<tr><td>18</td><td>Vcc</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>19</td><td>NC</td><td>-</td><td>-</td></tr>
<tr><td>20</td><td>FAWB Ⓗ</td><td>O</td><td>AWB circuit control signal. Goes high at FAWB functioning.</td></tr>
<tr><td>21</td><td>AF-DATA</td><td>O</td><td>Serial data output to AI microcomputer (see next page, 3-2-6.)</td></tr>
<tr><td>22</td><td>AF-STROBE</td><td>I</td><td>Answering signal input from AI microcomputer.</td></tr>
<tr><td>23</td><td>-</td><td>-</td><td>Connected to ground.</td></tr>
<tr><td>24</td><td>K-STROBE</td><td>I</td><td>Used as a strobe in serial data communication with the main microcomputer IC601. Serial data communication is carried out while the signal goes high.</td></tr>
<tr><td>25</td><td>-</td><td rowspan="3">-</td><td rowspan="3">Connected to ground.</td></tr>
<tr><td>26</td><td>-</td></tr>
<tr><td>27</td><td>-</td></tr>
<tr><td>28</td><td>KEY OUT 0</td><td rowspan="2">O</td><td rowspan="2">Key matrix output.</td></tr>
<tr><td>29</td><td>KEY OUT 1</td></tr>
<tr><td>30</td><td>NC</td><td>-</td><td>-</td></tr>
<tr><td>31</td><td>KEY OUT 2</td><td>O</td><td>Key matrix output.</td></tr>
<tr><td>32</td><td>KEY IN 0</td><td rowspan="4">I</td><td rowspan="4">Key matrix input.</td></tr>
<tr><td>33</td><td>KEY IN 1</td></tr>
<tr><td>34</td><td>KEY IN 2</td></tr>
<tr><td>35</td><td>KEY IN 3</td></tr>
<tr><td>36</td><td>X IN</td><td>I</td><td rowspan="2">Connected with 8 MHz crystal oscillator.</td></tr>
<tr><td>37</td><td>X OUT</td><td>O</td></tr>
</table>

Table I-1(2/2) Terminal functions of camera key microcomputer (IC2801)

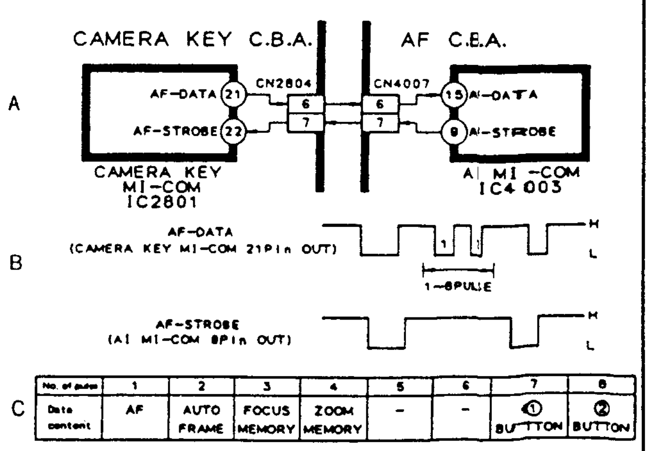
Terminal	Signal designation	I/O	Function
38	RESET Ⓛ	I	Input for resetting microcomputer when the power source connected. Resetting is made when the signal which lags behind the leading edge of EVER 5V goes low.
39	VD	I	Interrupt terminal. Interruption is made with VD.
40	-	-	Connected to ground.
41	NC	-	-
42	Vss	-	Connected to ground.
43	NC	-	-
44	CLOCK 2	I	Clock input for serial data communication with the main microcomputer IC601.
45	K-DATA IN	I	Data input for serial data communication with the main microcomputer IC601.
46	K-DATA OUT	O	Data output for serial data communication with the main microcomputer IC601.
47	SRAM-CS	O	Indicate signal for SRAM data communication. (for digital title memory function) When the digital title memory mode is set, the signal goes high to start the data communication between SRAM (IC2701) and CONTROLLER (IC2702) in the digital memory C.B.A.
48	IMPOSE Ⓗ	O	Goes high for displaying the digital title. At memorizing, it goes low.

3-2-6 Data communication from camera key microcomputer IC2801 to AI microcomputer IC4003

The data communication from the camera key microcomputer IC2801 to the AI microcomputer IC4003 starts when a low pulse is output (AF-DATA) from pin 21 and received at the AI microcomputer and outputting a low pulse (AF-STROBE) from pin 9.

The data content output from the IC2801 are changed by the number of pulse counted down. (See C of the Fig. I-23)

When the state of high period at pin 21 of IC2801 lasts for 400 µs, a low pulse is output from pin 9 of the IC4003. On receiving this low pulse, the low pulse is output from IC2801. At this time, the communication is finished.



A
B
C
CAMERA KEY C.B.A.
AF C.B.A.
AF-DATA
AF-STROBE
21
22
CN2804
6
7
CN4007
6
7
15
9
AI-DATA
AI-STROBE
CAMERA KEY MI-COM IC2801
AI MI-COM IC4003
AF-DATA (CAMERA KEY MI-COM 21Pin OUT)
H
L
1
1-8PULSE
AF-STROBE (AI MI-COM 9Pin OUT)
H
L
No. of pulse
1
2
3
4
5
6
7
8
Data content
AF
AUTO FRAME
FOCUS MEMORY
ZOOM MEMORY
-
-
① BUTTON
② BUTTON

Fig. I-23

3-2-7 Terminal functions of camera microcomputer (IC2601)

Table I-2(1/2) Terminal functions of camera microcomputer (IC2601)

Terminal	Signal designation	I/O	Function
1	NC	-	-
2	R GAIN PWM	O	Output for control the gain of R-Y signal.
3	BLC PWM	O	Control signal output for back light compensation.
4	NC	-	-
5			
6			
7			
8	D3	O	Outputs indicate the camera microcomputer adjustment mode status.
9	D2		
10	D1		
11	D0		
12	NC	-	-
13			
14			
15			
16			
17	VD	I	Input of synchronizing signal used for pulse generation.
18			
19	CP2	I	
20	NC	-	-
21			
22			
23			
24			
25	Vss	-	Connected to ground.
26	RESET Ⓛ	I	Input for resetting microcomputer. Resetting is made when the signal which lags behind the leading edge of EVER 5V goes low.
27	NC	-	-
28	X IN	I	Connected with 10 MHz crystal oscillator.
29	X OUT	O	
30	NC	-	-
31			
32	Vss	-	Connected to ground.
33	NC	-	-
34			
35 | 41			
42	PAL Ⓗ	I	Used as identification input for television system. Goes high for PAL, and low for NTSC.
43	FAWB Ⓗ	I	AWB circuit control signal. Goes high at FAWB functioning.
44	EVR DOWN	I	Used for microcomputer adjustment switch.
45	EVR UP		
46	EVR SEL	I	Used for microcomputer channel switch selection. Goes high for R CONT, and low for B CONT.
47	DATA SET	I	Used for data reading in microcomputer adjustment.
48	MODE SEL	I	Used for changing the step in microcomputer adjustment.
49	ADJ. MOD	I	Adjustment mode switching input. Goes high in adjustment mode, and low in normal mode.

Table I-2(2/2) **Terminal functions of camera microcomputer (IC2601)**

Terminal	Signal designation	I/O	Function
50 | 54	NC	-	-
55	GATE PULSE	O	Control signal for dividing the screen into 15.
56 | 61	NC	-	-
62	Y IRIS	I	Y IRIS signal for controlling back light compensation.
63	Y_H	I	Y_H signal for controlling the auto knee circuit.
64	B-Y	I	B-Y signal for AWB function.
65	R-Y	I	R-Y signal for AWB function.
66	B CONT	O	B-Y control signal for AWB function.
67	R CONT	O	R-Y control signal for AWB function.
68	VREF (D/A)	I	Reference voltage for D/A conversion.
69	VREF (A/D)	I	Reference voltage for A/D conversion.
70	Vss	-	Connected to ground.
71	Vcc	I	Connected to CAMERA 5V.
72	Vcc	I	Connected to CAMERA 5V.
73	Vss	-	Connected to ground.
74	E^{2}PROM - CS	O	Used for chip selection in serial data communication with the E^{2}PROM (IC2602). Goes high at communicating.
75	E^{2}PROM CLOCK	O	Clock output for serial data communication with the E PROM (IC2602).
76	E^{2}PROM DATA OUT	O	Data output for serial data communication with the E PROM (IC2602).
77	E^{2}PROM DATA IN	I	Data input for serial data communication with the E PROM (IC2602).
78	KNEE PWM	O	Control signal for the auto knee circuit.
79	B GAIN PWM	O	Control signal for the gain of B-Y signal.
80	NC	-	-

3-2-8 Communication sequence between camera microcomputer IC2601 and E^{2}PROM

The camera microcomputer IC2601 communicates with the E PROM only. The communication method is similar to A1E,F's.

(In the E640E,F, the communication between the recorder section and the camera section is made between the camera key microcomputer IC2801 and the main microcomputer IC601.)

3-3 Recorder section

3-3-1 System control circuit

The system control operation is carried out mainly with the main microcomputer IC601 and the QD microcomputer IC602. The system control input signals are the function key signals, the mechanical switch signals, the error detecting signals, the servo data signals and the wireless remote control signals. These signals are processed in the two microcomputers for controlling the various operations.

The serial data communication among each microcomputers, EVF and VIDEO ICs is under control of the main microcomputer IC601.

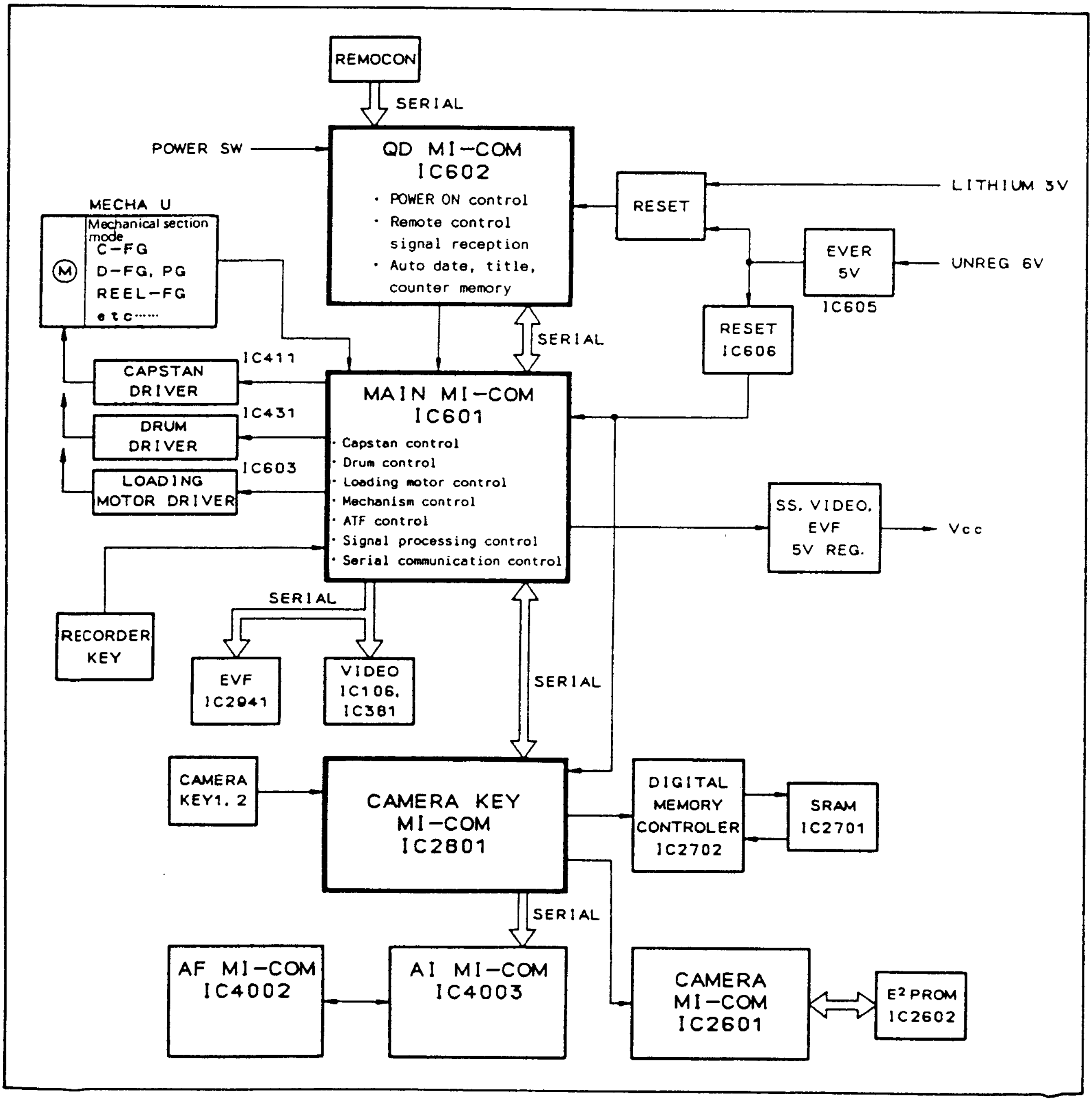

REMOCON
SERIAL
POWER SW
QD MI-COM IC602
• POWER ON control
• Remote control signal reception
• Auto date, title, counter memory
RESET
LITHIUM 3V
EVER 5V
IC605
UNREG 6V
MECHA U
Mechanical section mode
C-FG
D-FG, PG
REEL-FG
etc……
M
RESET IC606
SERIAL
CAPSTAN DRIVER
IC411
DRUM DRIVER
IC431
LOADING MOTOR DRIVER
IC603
MAIN MI-COM IC601
• Capstan control
• Drum control
• Loading motor control
• Mechanism control
• ATF control
• Signal processing control
• Serial communication control
SS. VIDEO, EVF 5V REG.
Vcc
SERIAL
RECORDER KEY
EVF IC2941
VIDEO IC106, IC381
SERIAL
CAMERA KEY1, 2
CAMERA KEY MI-COM IC2801
DIGITAL MEMORY CONTROLER IC2702
SRAM IC2701
SERIAL
AF MI-COM IC4002
AI MI-COM IC4003
CAMERA MI-COM IC2601
E² PROM IC2602

Fig. I-24

(1) Power supply circuit

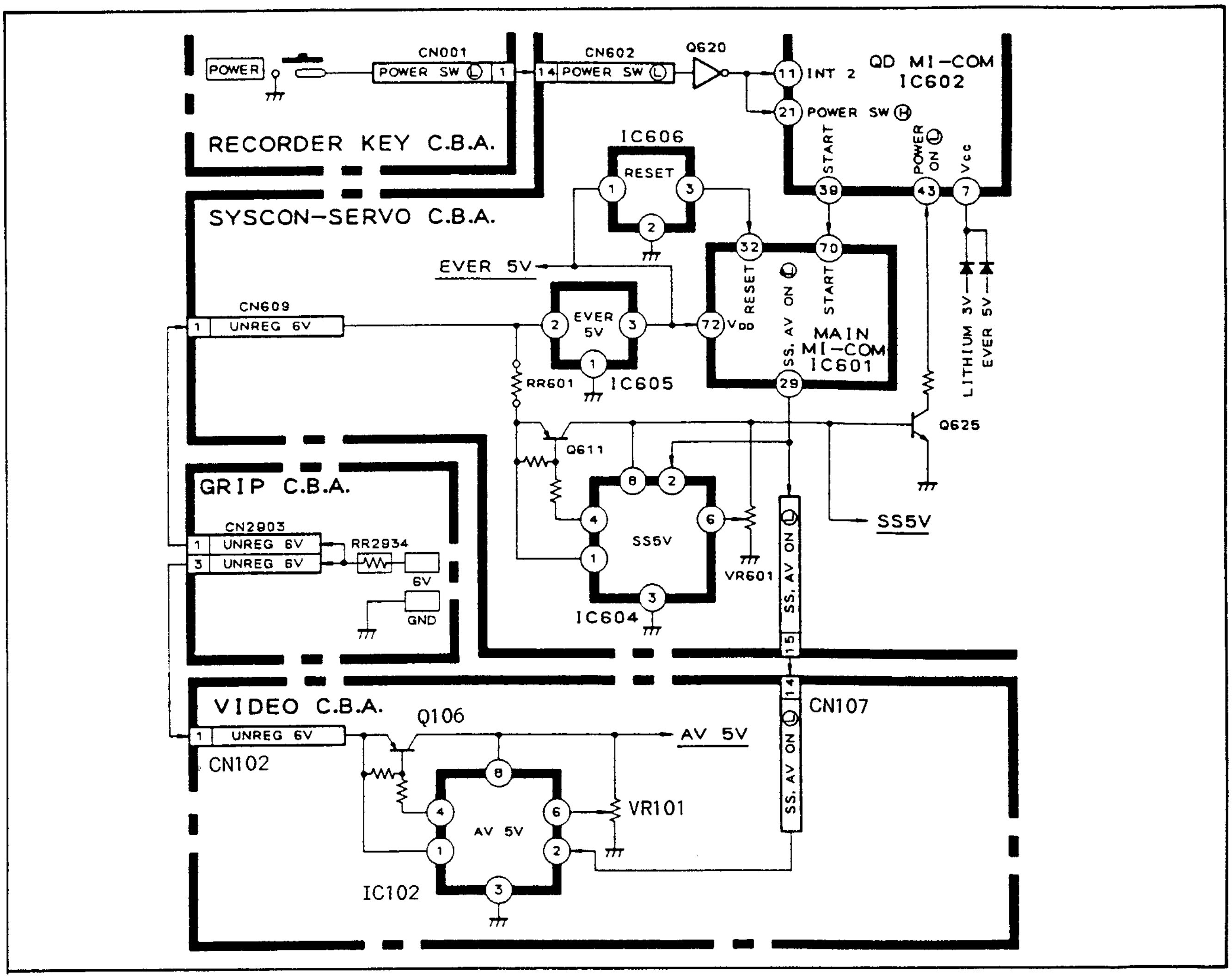

POWER
CN001
POWER SW Ⓛ
1
RECORDER KEY C.B.A.
CN602
14
POWER SW Ⓛ
Q620
11
INT 2
QD MI-COM
IC602
21
POWER SW Ⓗ
START
POWER ON Ⓛ
Vcc
39
43
7
IC606
RESET
1
3
2
SYSCON-SERVO C.B.A.
EVER 5V
32
70
RESET
SS. AV ON Ⓛ
START
CN609
1
UNREG 6V
2
EVER 5V
3
72
VDD
MAIN
MI-COM
IC601
1
RR601
IC605
29
LITHIUM 3V
EVER 5V
Q625
Q611
GRIP C.B.A.
8
2
CN2903
1
UNREG 6V
3
UNREG 6V
RR2934
4
6
SS5V
SS5V
6V
1
VR601
GND
3
SS. AV ON Ⓛ
IC604
15
14
VIDEO C.B.A.
Q106
CN107
1
UNREG 6V
AV 5V
CN102
8
SS. AV ON Ⓛ
4
6
VR101
AV 5V
1
2
IC102
3

Fig. I-25

① Kinds of power source

The power voltage for recorder section is generated from UNREG 6V supplied from the battery or the AC adapter.
Also, the 3V power of lithium battery is provided as a back up power for the auto data and timer functions.

Listed below are the voltage sources for the recorder section.

1) EVER 5V

When the battery terminal is connected with the power source, the voltage is converted to 5V power through the three-terminal regulator (IC605) on the SYSCON-SERVO C.B.A. As long as the power source is connected, this 5V power is constantly delivered.

2) SS 5V

When the power switch is turned on, from pin 29 of main microcomputer IC601, the SS AV ON L signal is output to turn on the IC604. Then the preset voltage determined by VR601 is compared with the internal reference voltage level to control the transistor Q611. In this manner, the SS 5V is constantly delivered.

3) AV 5V

The AV 5V is generated as in the same manner as above SS 5V. This voltage is used as a source for AV circuit.

4) Lithium 3V

The LITHIUM 3V voltage is used as a backup voltage for the auto date and timer functions when the main power source (+6V) is disconnected.

② Power-on

When power supply is connected to the battery terminal, IC605 on the SS C.B.A. delivers EVER 5V as the power supply to each microcomputer. Then, the RESET signal from reset IC (IC606) is applied to pin 32 of main microcomputer IC601 for resetting. Upon completion of initialization, the microcomputer returns to sleep mode, or it is set in standby status. At this time, the QD microcomputer also stands by in the sleep mode.
When the power switch is turned on, Ⓗ signal is input to pin 11 of QD microcomputer. This signal causes the microcomputer to handle interruption of reading the POWER SW Ⓗ signal applied to pin 21. And the start pulse is issued from pin 39 to start the main microcomputer. On reception of the start pulse at pin 70, the main microcomputer is reset from the sleep mode and outputs power control signal in response to each mode.
When SS 5V is generated according to the SS, AV ON Ⓛ signal appearing at pin 29, Q625 turns on to deliver POWER ON Ⓛ signal to pin 43 of the QD microcomputer as a confirmation of main microcomputer start. Start pulse is issued up to 3 times at intervals of 17 msec. If the POWER ON Ⓛ signal is not detected during issuance of the start pulse, the sleep mode is assumed again.

③ Resetting of QD microcomputer

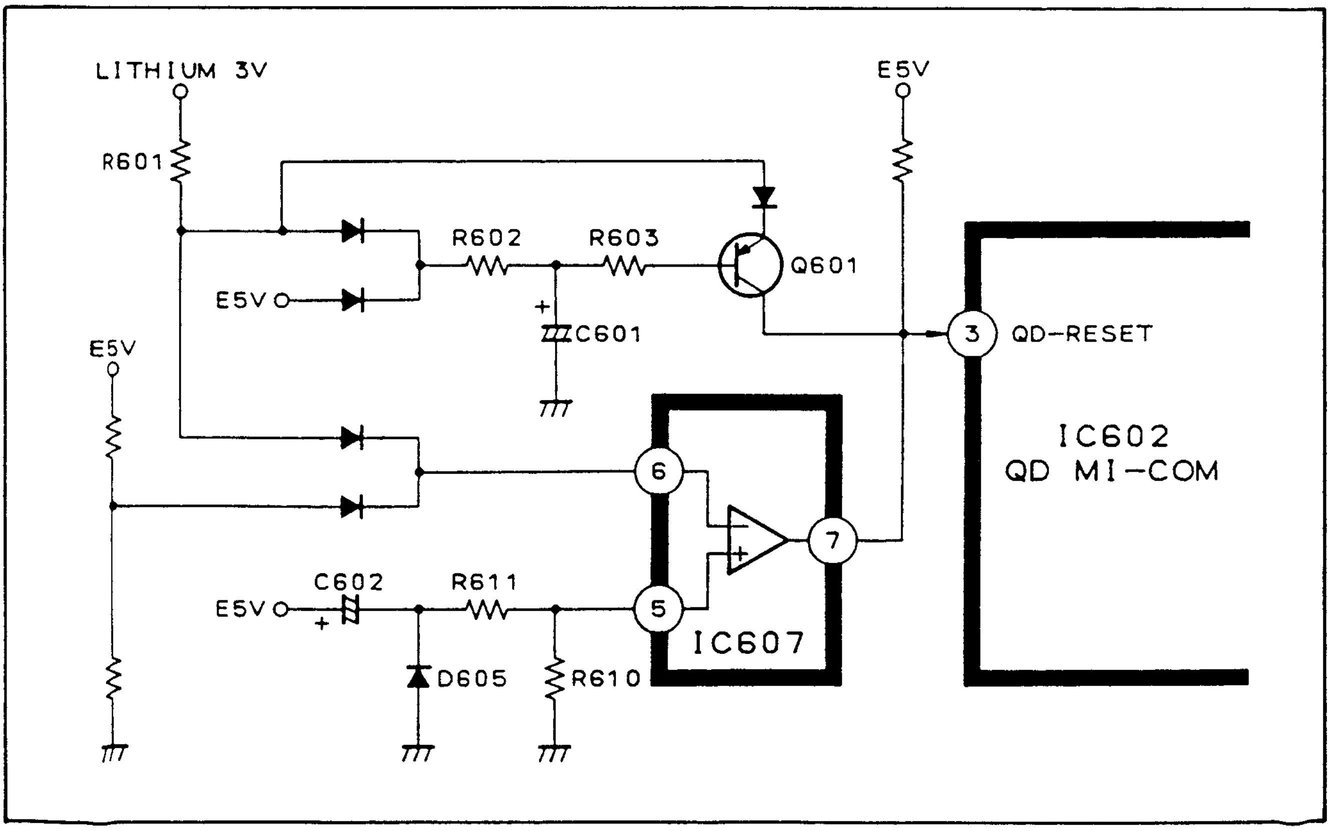


Fig. I-26

This microcomputer is reset in the following cases.

1) Lithium battery is introduced when the main battery is not mounted.
2) Main battery is introduced when the lithium battery is not mounted.

° Case 1)

When the lithium battery is mounted, 3V is applied to the Q601 emitter, and the potential at Q601 base rises at the timing determined by each time constant of R602 and C601. Reset pulse is not issued before Q601 turns off. On mounting the main battery, the reset pulse is not generated because the transistor base is already at the Ⓗ level.

° Case 2)

When the main battery is mounted, EVER 5V is output, and pulse is generated at the timing determined by each time constant of C602 and R611, which is applied to pin 5 of IC607. At this time, the comparator in that IC issues the reset pulse from pin 7 to pin 3 of QD microcomputer for its resetting. On mounting the lithium battery, the reset pulse is not generated since 3V is applied to pin 6 of IC607.

(2) Terminal functions of main microcomputer IC601

Table I-3(1/3) Terminal functions of main microcomputer IC601

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>1</td><td>SEL 1</td><td>0</td><td>Used for controlling the ATF PILOT signal frequencies.
<table>
<tr><td>PILOT</td><td>f_1</td><td>f_2</td><td>f_3</td><td>f_4</td></tr>
<tr><td>SEL 1</td><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>SEL 2</td><td>H</td><td>H</td><td>L</td><td>L</td></tr>
</table></td></tr>
<tr><td>2</td><td>HEAD SW PULSE</td><td>0</td><td>Head switching pulse output.</td></tr>
<tr><td>3</td><td>AV PB Ⓗ</td><td>0</td><td>REC/PB select signal on AUDIO and VIDEO circuits.
Goes high in playback.</td></tr>
<tr><td>4</td><td>JOG Ⓗ</td><td>0</td><td>Time constant select signal on RF AGC circuit.
Goes high for accelerated/decelerated playback.</td></tr>
<tr><td>5</td><td>A MUTE Ⓗ</td><td>0</td><td>Audio mute signal. Goes high for muting.</td></tr>
<tr><td>6</td><td>V MUTE Ⓗ</td><td>0</td><td>Video mute signal. Goes high for muting.</td></tr>
<tr><td>7</td><td>LINE IN Ⓛ</td><td>0</td><td>IN/OUT select signal for AV termfinal.
Goes low when the line input is selected.</td></tr>
<tr><td>8</td><td>DRUM FWD Ⓛ</td><td>0</td><td>Selects turning direction of the head drum motor.
Goes low for normal (forward) direction.</td></tr>
<tr><td>9</td><td>DRUM ON Ⓛ</td><td>0</td><td>Head drum motor on/off signal. Goes low when the motor is turned on, and it is turned off and brake is applied when the signal goes high.</td></tr>
<tr><td>10</td><td>CAPSTAN FWD Ⓗ</td><td>0</td><td>Selects turning direction of the capstan motor.
Goes high for normal (forward) direction.</td></tr>
<tr><td>11</td><td>K-STROBE</td><td>0</td><td>Serves as the strobe signal for communication with IC2801 (C-KEY microcomputer). Effective during the signal goes low.</td></tr>
<tr><td>12</td><td>QD-STROBE</td><td>0</td><td>Responds to communicate with IC602 (QD microcomputer).
Signal is transmitted/received during low period.</td></tr>
<tr><td>13</td><td>TALLY</td><td>0</td><td>Goes high to turn on the tally LED. This LED flashes at each interval in REC and timer modes, and lights up on reception of remote control signal.</td></tr>
<tr><td>14</td><td>POWER LED</td><td>0</td><td>Goes high to turn on the POWER LED. Lit when the power supply is turned on and flickers for alarming at 1 sec intervals.</td></tr>
</table>

Table I-3(2/3) Terminal functions of main microcomputer IC601

Terminal	Signal designation	I/O	Function
15	NC	-	-
16			
17	SW PULSE 1	O	Overlap recording control signal for CH-1 head ON/OFF switch.
18	SW PULSE 2	O	Overlap recording control signal for CH-2 head ON/OFF switch.
19	BOT Ⓛ	I	When the beginning of tape is detected, this signal goes low.
20	EOT Ⓛ	I	When the end of tape is detected, this signal goes low.
21	MODE SW3	I	Mechanical mode switch input. (Consists of three bits: Used for detecting mechanism mode position.)
22	MODE SW2		
23	MODE SW1		
24	V-STROBE	O	Video ICs (IC106, 381) control signal for reading the data.
25	CG-STROBE	O	IC2941's (character IC) control signal for reading the data.
26	CAPSTAN ON Ⓛ	O	Capstan motor ON/OFF signal. The motor is turned on in low state, and braked off in high state.
27	TAPE SENS. LED	O	BOT/EOT (tape loading status) sensing LED turn-on signal.
28	EVF ON Ⓛ	O	EVF 5V regulator control signal. Goes low when the regulator is turned on.
29	SS, AV ON Ⓛ	O	SS 5V and AV 5V regulators control signal. Goes low when the regulator is turned on.
30	CAMERA ON Ⓛ	O	Camera power supply control signal. Goes low in ON state.
31	-	-	Connected to ground.
32	RESET	I	Microcomputer resetting pulse when the power source is connected.
33	-	-	Connected to ground.
34	X OUT	O	Connected with the 8 MHz crystal oscillator.
35	X IN	I	
36	-	-	Connected to EVER 5V.
37	QDK-DATA IN	I	Serial data communication input for QD and camera key microcomputers.
38	QDK-DATA OUT	O	Serial data communication output for QD and camera key microcomputers.
39	CLOCK 2	O	Serial data communication clock pulse for QD and camera key microcomputers.
40	-	-	Connected to ground via a resistor.
41	-	-	Connected to EVER 5V.
42	VC-DATA OUT	O	Output for video, character data serial communication.
43	CLOCK 1	O	Serial communication clock pulse for VC-DATA.
44	BATT.	I	Insufficient battery power detecting terminal.
45	DEW Ⓗ	I	Goes high when the dew condensation occurred.
46	T-REEL FG	I	Signal input for detection of T-reel rotation.
47	S-REEL FG	I	Signal input for detection of S-reel rotation.
48	STILL ADJ.	I	Not used.
49	R-KEY	I	Recorder key input.
50	SW. POINT ADJ.	I	Switching point adjustment terminal.
51	ATF ERROR	I	ATF error input terminal.
52	AVss	-	Connected to ground.
53	AVref	I	Connected to EVER 5V.
54	AV	I	Connected to EVER 5V.
55	SEL (A)	I	Television system switching terminal. Goes high for Japan, and low for U.S.A., Canada, etc.
56	CASSETTE DOWN Ⓛ	I	Indicates the input of CASSETTE COMPARTMENT DOWN switch. Goes high when in an up state, and low in a down state.
57	SAFETY TAB Ⓗ		Goes high when the cassette erroneous-erase protect. Switch is set to the ERASE-INHIBIT position.

Table I-3(3/3) Terminal functions of main microcomputer IC601

<table>
<tr><th>Terminal</th><th>Signal designation</th><th>I/O</th><th>Function</th></tr>
<tr><td>58</td><td>C-SYNC</td><td>I</td><td>Synchronizing signal input terminal for rotary servo.</td></tr>
<tr><td>59</td><td>ATF LOCK Ⓛ</td><td>I</td><td>Goes low when ATF phase servo is phase-locked normally in playback.</td></tr>
<tr><td>60</td><td>D-PG</td><td>I</td><td>Drum PG signal input terminal.</td></tr>
<tr><td>61</td><td>D-FG</td><td>I</td><td>Drum FG signal input terminal.</td></tr>
<tr><td>62</td><td>C-FG</td><td>I</td><td>Capstan FG signal input terminal.</td></tr>
<tr><td>63</td><td>FADE Ⓗ</td><td>O</td><td>Fade control signal output. Goes high when turned on.</td></tr>
<tr><td>64</td><td>SP Ⓗ/LP Ⓛ</td><td>O</td><td>Goes high for changing video circuit characteristic according to tape speed.</td></tr>
<tr><td>65</td><td>LOADING Ⓗ</td><td>O</td><td rowspan="2">Loading motor control signals
<table>
<tr><th>Signal name/operation</th><th>LOAD</th><th>UNLOAD</th><th>BRAKE</th></tr>
<tr><td>LOAD</td><td>H</td><td>L</td><td>H</td></tr>
<tr><td>UN-LOAD</td><td>L</td><td>H</td><td>H</td></tr>
</table></td></tr>
<tr><td>66</td><td>UN-LOADING Ⓗ</td><td>O</td></tr>
<tr><td>67</td><td>C-PWM</td><td>O</td><td>Capstan motor driving signal.</td></tr>
<tr><td>68</td><td>D-PWM</td><td>O</td><td>Drum motor driving signal.</td></tr>
<tr><td>69</td><td>QD-REQUEST</td><td>I</td><td>Inputs communication request signal from IC602 (QD microcomputer). Communicable during "L" period.</td></tr>
<tr><td>70</td><td>START</td><td>I</td><td>Release standby mode input terminal as specified from IC602 (QD microcomputer).</td></tr>
<tr><td>71</td><td>-</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>72</td><td>VDD</td><td>I</td><td>Connected to EVER 5V.</td></tr>
<tr><td>73</td><td>Vss</td><td>-</td><td>Connected to ground.</td></tr>
<tr><td>74</td><td>-</td><td>-</td><td>Connected to EVER 5V.</td></tr>
<tr><td>75</td><td>ATF SW</td><td>O</td><td>Selects BPF for ATF.
This signal goes low if an ATF error is detected on the f_1 or f_3 track. And, it goes high on detection of an ATF error on the f_2 or f_4 track.</td></tr>
<tr><td>76</td><td>FE ON Ⓛ</td><td>O</td><td>Flying erase head oscillation control signal.
Goes low to turn on oscillation.</td></tr>
<tr><td>77</td><td>RF PB Ⓗ</td><td>O</td><td>Signal for selecting REC or PB of head amplifier, ATFIC. Goes high for playback.</td></tr>
<tr><td>78</td><td>TS B</td><td>O</td><td>ATF lock sampling and holding signal.
Goes low for sampling and high for holding.</td></tr>
<tr><td>79</td><td>JOG VD</td><td>O</td><td>Pseudo VD output to be inserted into video signal at the time of decelerated/accelerated playback.</td></tr>
<tr><td>80</td><td>SEL2</td><td>O</td><td>Controls the frequency of ATF PILOT signal. Refer to terminal No.1.</td></tr>
</table>

(3) Terminal functions of QD microcomputer IC602

Table I-4(1/2) Terminal functions of QD microcomputer IC602

Terminal	Signal designation	I/O	Function
1	NC	-	-
2	-	-	Connected to ground.
3	QD-RESET	I	Inputs the pulse for resetting the QD microcomputer.
4	NC	-	-
5	CL1	I	System clock adjustment terminal.
6	NC	-	-
7	Vcc	I	Connected to EVER 5V.
8	NC	-	-
9	CL2	I	System clock adjustment terminal.
10	INT1	I	Interruption terminal when remote control is employed.
11	INT2	I	Power switch and eject switch.
12	CLOCK2	I	Clock pulse for QD-DATA serial communication.
13	NC	-	-
14			
15	QD-DATA OUT	O	Issues output to the main microcomputer IC601 in serial communication.
16	QD-DATA IN	I	Receives input from the main microcomputer IC601 in serial communication.
17	TELE SW Ⓗ	I	Zoom switch input terminals.
18	WIDE SW Ⓗ		
19	-	-	Unused.
20	-	-	Unused.
21	POWER SW Ⓗ	I	Inputs power switch signal. This signal goes high when the switch is turned on.
22	QD-STROBE	I	Response signal in serial communication with main microcomputer IC601. Communicable only the signal goes low.
23	EJECT SW Ⓗ	I	Inputs eject switch signal. Effective even with power turned off so far as the battery is connected.
24	REMOCON	I	Inputs code transmitted from the remote controller.
25	TITLE/DATE SW Ⓗ	I	Inputs signal from the switch which selects title/date setting mode. When pressing the switch once, title mode is selected, and it is changed over to date setting mode when pressing the switch for 3 seconds or longer.
26	SHIFT SW Ⓗ	I	Cursor and setting item are shifted whenever pressing the SHIFT switch in title/date setting mode.
27	NC	-	-
28	+ SW Ⓗ	I	Used for picture search, title character.
29	NC	-	-
30	- SW Ⓗ	I	Used for picture search, title character.
31	Vss	-	Connected to ground.
32	X1	O	32 kHz crystal oscillation terminal.
33	Vcc	I	Connected to EVER 5V.
34	X2	I	32 kHz crystal oscillation terminal.
35	NC	-	-
36			
37	TEST OUT	O	Outputs the signal obtained by dividing clock frequency into 4 in test mode.
38	QD-REQUEST	O	Outputs communication request signal (with IC601) Communicable during low state.

Table I-4(2/2) Terminal functions of QD microcomputer IC602

Terminal	Signal designation	I/O	Function
39	START	O	Outputs pulse to release microcomputer from standby mode when a power switch or an eject switch is pressed.
40	NC	-	-
41	TEST Ⓛ	I	Goes low in test mode.
42	MAIN BATT SET Ⓛ	I	Goes low with battery connected.
43	POWER ON Ⓛ	I	Signal for checking power-up. Goes low when the power turned on.
44	LITHIUM EMPTY Ⓛ	I	Inputs low signal when the terminal voltage of lithium battery is about 2.7 V or less.
45	NC	-	-
46	TELE Ⓗ	O	Zooming motor control signal. Switched over by a zoom switch and a remote control signal.
47	WIDE Ⓗ		
48	-	-	Unused.
49	REMOCON ON Ⓛ	I	AF lock signal. Misoperation is prevented by releasing AF function on reception of remote control signal.
50	-	-	Connected to ground.
52			

(4) Data communication

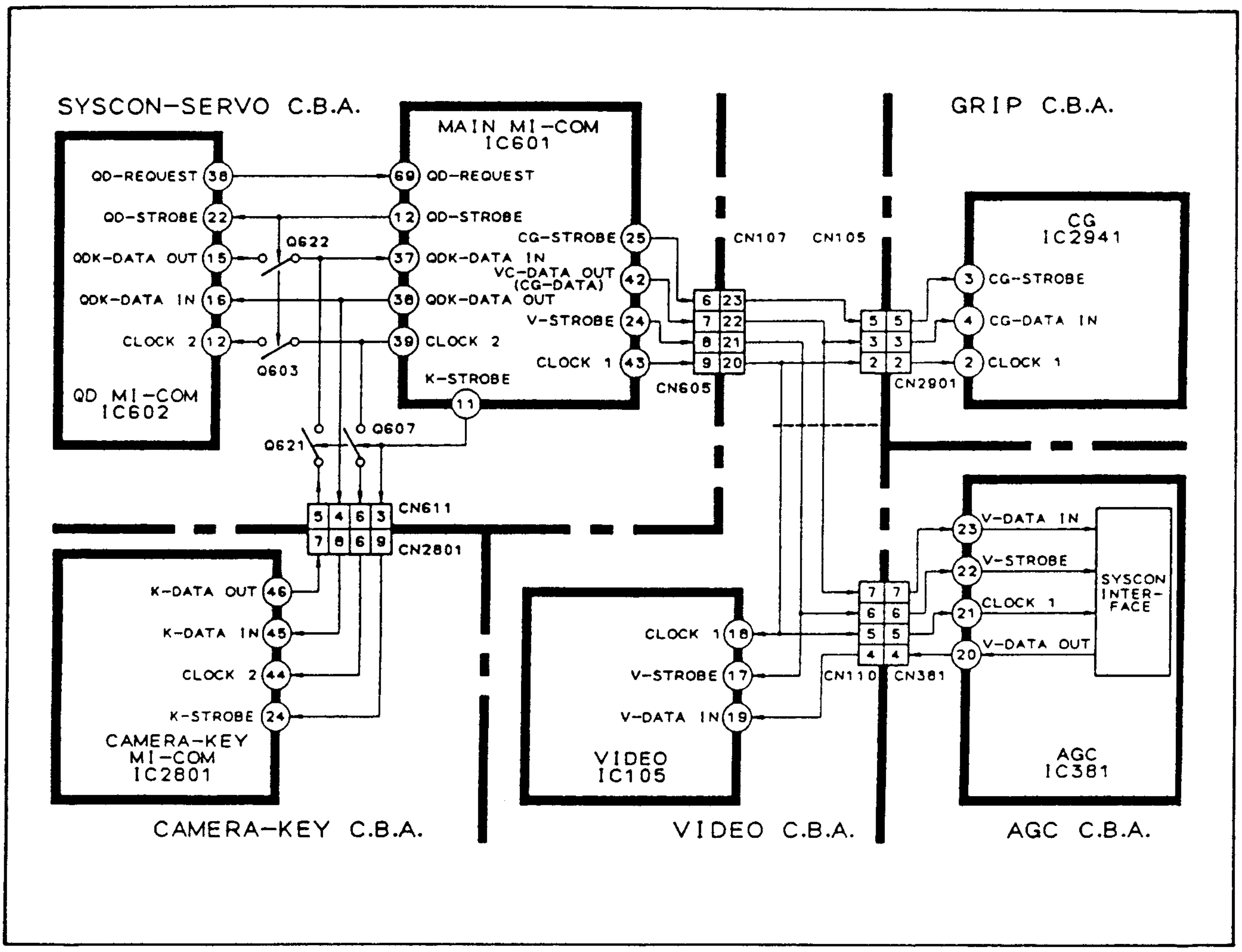

SYSCON-SERVO C.B.A.
QD-REQUEST 38
QD-STROBE 22
QDK-DATA OUT 15
QDK-DATA IN 16
CLOCK 2 12
QD MI-COM IC602
Q622
Q603
MAIN MI-COM IC601
69 QD-REQUEST
12 QD-STROBE
37 QDK-DATA IN
38 QDK-DATA OUT
39 CLOCK 2
K-STROBE 11
CG-STROBE 25
VC-DATA OUT (CG-DATA) 42
V-STROBE 24
CLOCK 1 43
Q621
Q607
CN611
CN2801
CN107
CN105
CN605
CN2901
GRIP C.B.A.
CG IC2941
3 CG-STROBE
4 CG-DATA IN
2 CLOCK 1
CAMERA-KEY C.B.A.
K-DATA OUT 46
K-DATA IN 45
CLOCK 2 44
K-STROBE 24
CAMERA-KEY MI-COM IC2801
VIDEO C.B.A.
CLOCK 1 18
V-STROBE 17
V-DATA IN 19
VIDEO IC105
CN110
CN381
AGC C.B.A.
23 V-DATA IN
22 V-STROBE
21 CLOCK 1
20 V-DATA OUT
SYSCON INTER-FACE
AGC IC381

Fig. I-27

In the E640E,F, the following two serial data communications are carried out.

1) Bidirectional communication between the main microcomputer and the camera key microcomputer/QD microcomputer.

2) Unidirectional communication from the main microcomputer to the character generator, AGC and the video IC.

① Bidirectional communication between the main microcomputer and the QD microcomputer

In the bidirectional communication between the main microcomputer (IC601) and the QD microcomputer (IC602), 8-bit x 6-word communication is conducted. As the main microcomputer has no memory backup system when the power source is disconnected, the data which requires the backup voltage is fed to the QD microcomputer where the backup function is provided. The date (calendar) and the time information are applied from the QD microcomputer to the main microcomputer.

1) The QD microcomputer requests the main microcomputer to start serial data communication by making the QD-REQUEST signal at pin 38 to low. Then, the serial data communication is started when the main microcomputer makes the QD-STROBE at pin 12 to low within 17 msec. as a response.

2) Eight CLOCK2 pulses are output from pin 39 of the main microcomputer to complete the exchange of 1 word. In the course of communication, QD-STROBE is always monitored. When this signal goes high, the communication is suspended. Normally upon completion of transmitting/receiving 6 words, communication terminates.

3) On termination of 6-words communication, QD-STROBE is checked. When the signal goes high, the QD-REQUEST signal also goes high.

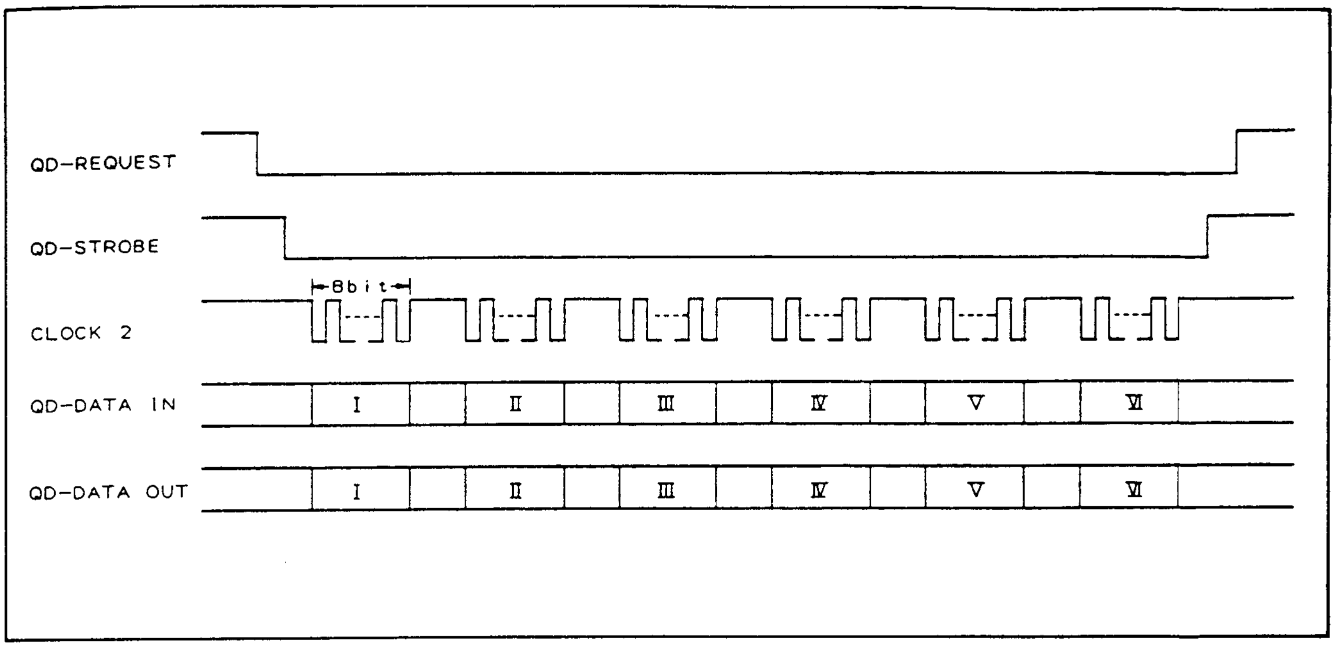


Fig. I-28

② Bidirectional communication between the main microcomputer and the camera key microcomputer

Between the main microcomputer and the camera key microcomputer, 8-bit x 4-word information is exchanged bidirectionally. Camera key information is transmitted to the main microcomputer for various processing purposes.

1) The K-STROBE signal is output from pin 11 of the main microcomputer. Data is transmitted in the low period.

2) Data D_1-D_4 are transmitted in synchronization with the CLOCK1 signal appearing at pin 39 of the main microcomputer to terminate communication. The K-STROBE signal is set high at this moment.

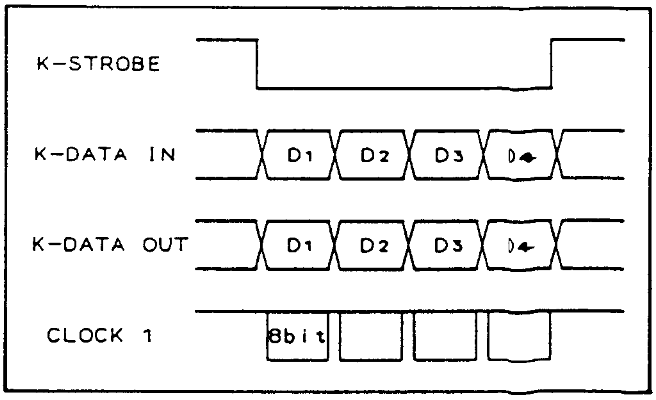


Fig. I-29

③ Video character data communication

IC601 (main microcomputer) outputs mode data, character data, etc. to each IC. This microcomputer communicates with three ICs; IC105 (video IC), IC381 (video input/output IC) and IC2941 (character IC).

All data are communicated over a single line. According to each strobe signal, data is input to each IC. Clock signal is also used in common. At its trailing edge, output data is set, and it is input at the leading edge.

° V-DATA transmission

VC-DATA, generated at pin 42 of the main microcomputer, is first fed to pin 23 of IC381. From this IC, the serial data deprived of the necessary data for IC381 is transmitted only when any change occurs in the contents of data.

° CG-DATA transmission

CG-DATA is transmitted over the VC-DATA line which is connected with pin 42 of the main microcomputer. Upon completion of transmitting each 8-bit data, IC2941 reads only the data, including the CG-STROBE signal, as the CG DATA.

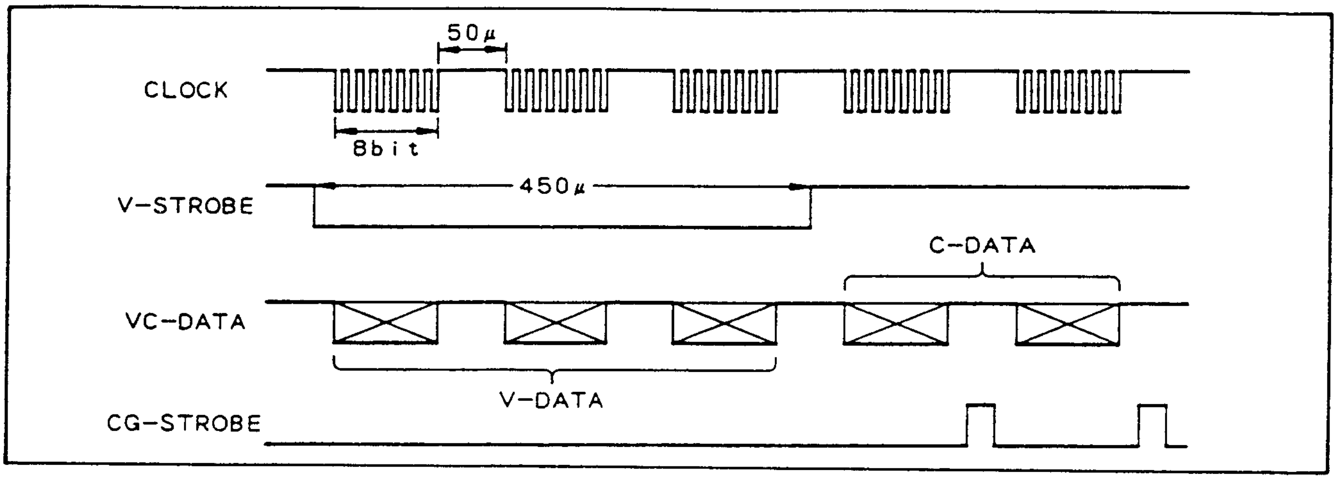


Fig. I-30

(5) Safety mechanisms

Alarm display, restrictions on acceptance of key entry and operation, etc. are provided for preventing mechanical damage or tape jamming due to abnormal state of the recorder.

① Detection of battery voltage drop

Battery voltage drop is detected in an independent circuit for each of the main and lithium batteries.

° Main battery

The drop of main battery voltage is detected in three stages as follows.

(UNDER CUT1)
When the battery terminal voltage drops to 5.65 V or less, it is detected as a voltage drop. LED at top of the main unit flashes and "BATT" appears in EVF for warning.
In this stage, input keys and operations are not regulated, so VCR is operated normally.
When voltage in the 6 V line drops below the specified level, the drop detection voltage input to pin 44 of the main microcomputer also goes low. This is judged as UNDER CUT1 status in that microcomputer. Subsequently, the microcomputer flashes LED through feeding signal to pin 14 and brings about alarm display in EVF via the VC-DATA signal output at pin 42.

(UNDER CUT2)
When the battery terminal voltage further drops to 5.45 V or less, it is set to STOP mode automatically and power is turned off.
Voltages drop is detected in the main microcomputer as in UNDER CUT1. The microcomputer activates the loading motor, shifts mechanism to the stop position, and then turns off each power supply control signal.

(Shut-off)

When the battery voltage drops to 4.5 V or less suddenly, the RESET IC606 is activated to reset the main microcomputer and turn off power supply immediately.

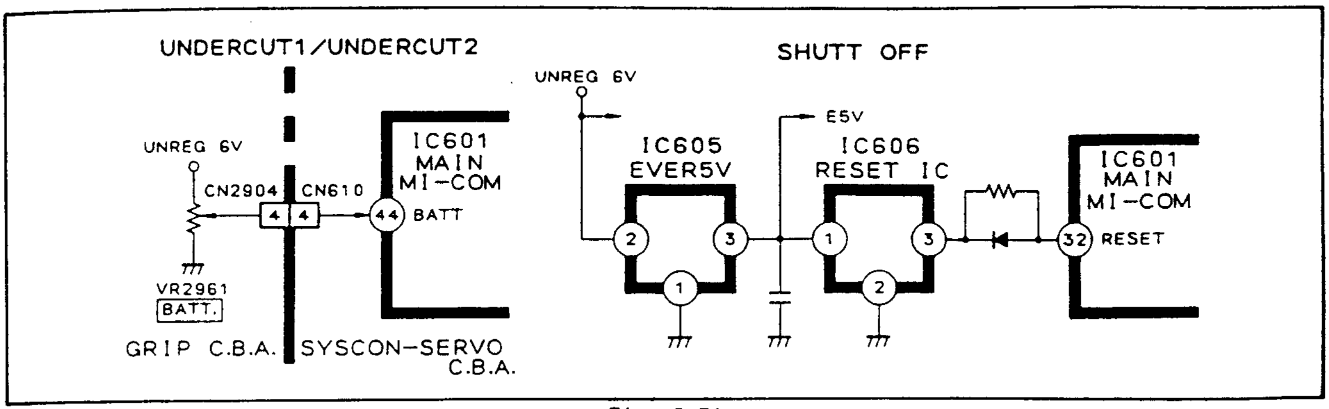

UNDERCUT1/UNDERCUT2
UNREG 6V
CN2904
CN610
VR2961
BATT.
IC601
MAIN
MI-COM
44
BATT
GRIP C.B.A.
SYSCON-SERVO C.B.A.
SHUTT OFF
UNREG 6V
E5V
IC605
EVER5V
IC606
RESET IC
IC601
MAIN
MI-COM
32
RESET

Fig. I-31

° Lithium battery

When the lithium battery terminal voltage falls to 2.7 V or less, the comparator output of IC607 goes low to warn the main microcomputer of voltage drop. The main microcomputer blinks "DATE" display in EVF.

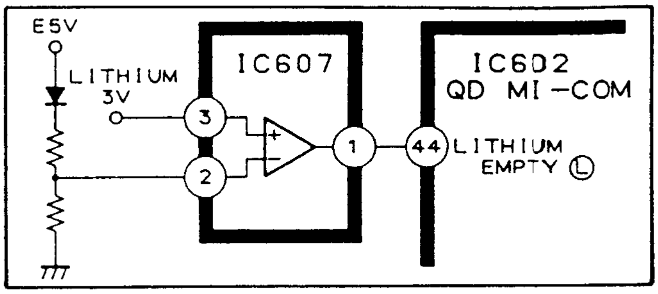

E5V
LITHIUM
3V
IC607
IC602
QD MI-COM
44
LITHIUM
EMPTY Ⓛ

Fig. I-32

② Dew condensation

This VCR incorporates the function for detecting dew condensation in order to prevent tape jamming due to sticking, etc.
If condensation is detected during operation, the mechanism performs [DEW EJECT] action and transition is made up to the unload/cassette-in status. at this stage, only the POWER and EJECT SWITCHES are effective. Even after removal of dew condensation, other key inputs are not acceptable only after power is turned off or the cassette is ejected. Loading is not implemented even when inserting a cassette while condensation remains.
As alarm, the POWER LED, "DEW" and "EJECT" indications in EVF flicker.
Under condensation, the DEW sensor on the recorder mechanism chassis increases its resistance and pin 45 of the main microcomputer receives an increased DEW detection voltage. Upon rise beyond a certain specified level, the microcomputer judges that condensation has occurred, and triggers mode transition and alarm display as above.

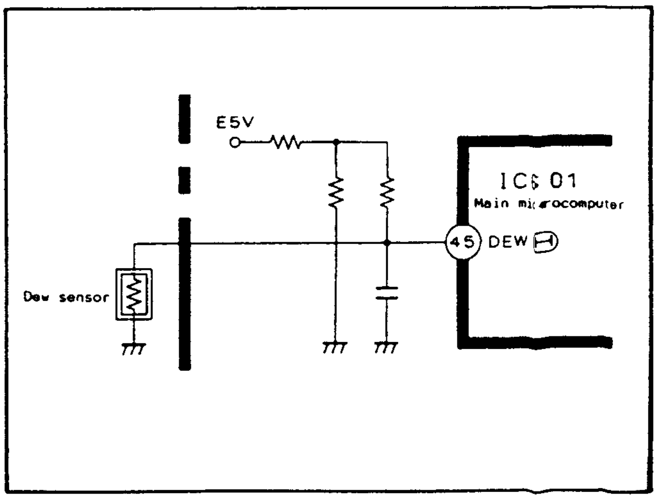

E5V
IC601
Main microcomputer
45
DEW Ⓗ
Dew sensor

Fig. I-33

[DEW EJECT]
Once tape has adhered to the head drum, the takeup reel alone is inadequate for rewinding the tape. So the supply reel must also be used for rewinding. For this purpose. the DEW EJECT sequence is effected as illustrated below in the event of dew condensation.

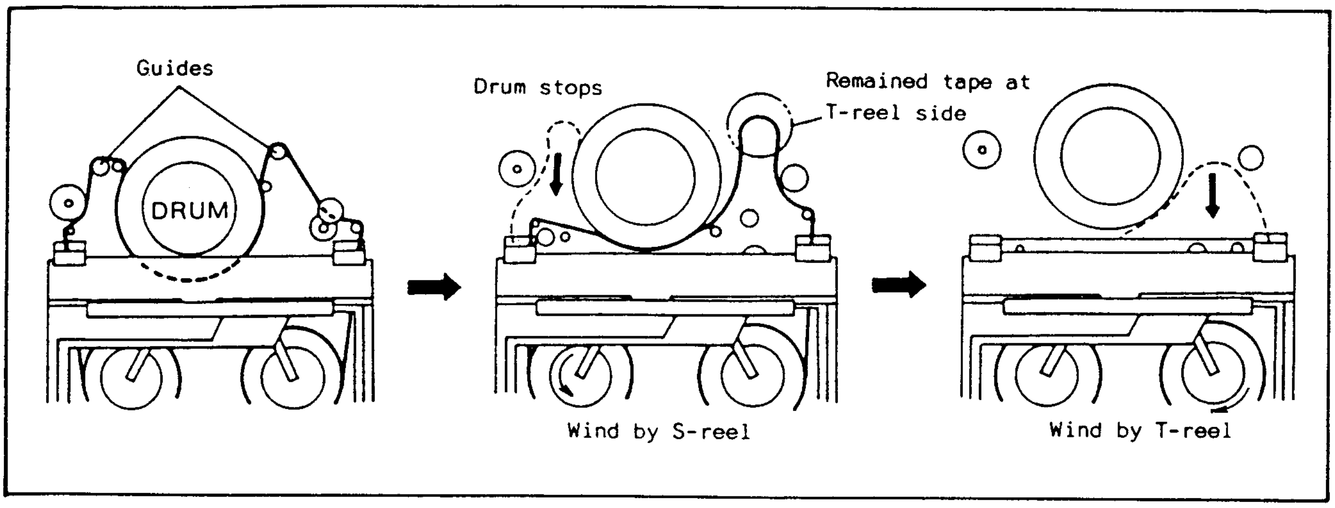


Fig. I-34

③ End-of-tape check

If the tape is run even after reaching its end, it may cause damage on the tape guide or squeezing on the head drum. To prevent this, the end-of-tape check function is provided in the system. When the end of tape is detected, the tape drive is forced to stop immediately.

The tape end detection LED is turned on/off according to the signal from pin 27 of the main microcomputer IC601. It always flickers at intervals of 1 msec. When the signals at pins 19 and 20 go low twice successively, the microcomputer judges that the end of tape is reached and it causes the mechanisms to stop. Also, when the EOT and BOT input signals become low twice successively at the same time. the microcomputer judges that the cassette is not loaded and it makes "TAPE" display blink in the EVF.

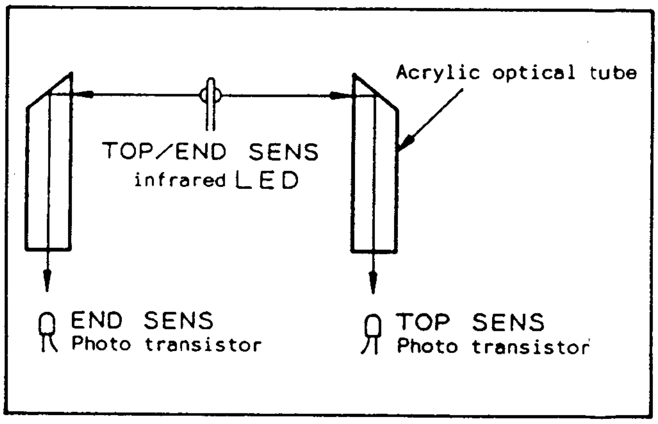


Fig. I-35

④ Pause timer

In the REC PAUSE or STILL mode, the drum rotates with tape wound around it. If this condition persists for a long period of time, the tape may wear or the head may be clogged. To prevent this, when the REC PAUSE state is kept for seven minutes, the mechanism is forced to the stop position and the power goes off. Also, when the STILL state is kept for seven minutes, the mechanism is forced to the stop position but the power remains on.

⑤ Trouble stop (error)

Upon detection of an error, the servo microcomputer (IC101) puts the mechanism in the stop state. Then, only the POWER and EJECT keys are usable. The error condition can thus be reset. In the event of trouble, the power LED indicator, the "EJECT" message flickers on viewfinder screen for warning.
(Capstan error is not detected in IC101 because it can be detected by the reel-error.)

Table I-5

Kinds of trouble stop	Contents	Method of detection
Drum error (during normal operation)	An error is issued if the drum speed decreases below approx. 50% of the normal rotation level lasts for approx. 2 sec.	Pin 61 of IC601: D-FG
Drum error (at start up)	An error is issued if the drum speed is not reached to approx. 50% of the normal rotation in 2 sec. immediately after the DRUM-PWM is output.	Pin 61 of IC601: D-FG
Reel error	Reel does not turn. (9 sec. or longer at playback 9 sec./each fast-speed sec. for other modes)	Pins 46 and 47 In forward feed : T-REEL FG In backward feed: S-REEL FG
Loading motor/ Safety timer	Mode transition is not completed within the specified period of time. (Mode transition operation : 3 seconds Load/unload operations : 8 seconds)	Timer in IC601 Mode SW (inputs at pins 21, 22 and 23)

⑥ Full-top loading

To prevent the beginning of tape from getting onto the drum upper surface in loading, the special sequence is performed upon detection of the beginning of tape after the cassette is inserted.

The takeup reel tenses the tape first, and then the drum motor is run in reverse slightly for approx. one second. Then, the claw on the upper drum prevents the tape from getting onto the drum surface by pushing the tape off from the drum. And, reverse braking is applied to the drum motor to wind the tape on the takeup reel again. Thereafter, the normal loading sequence is carried out.

3-3-2 Servo circuit

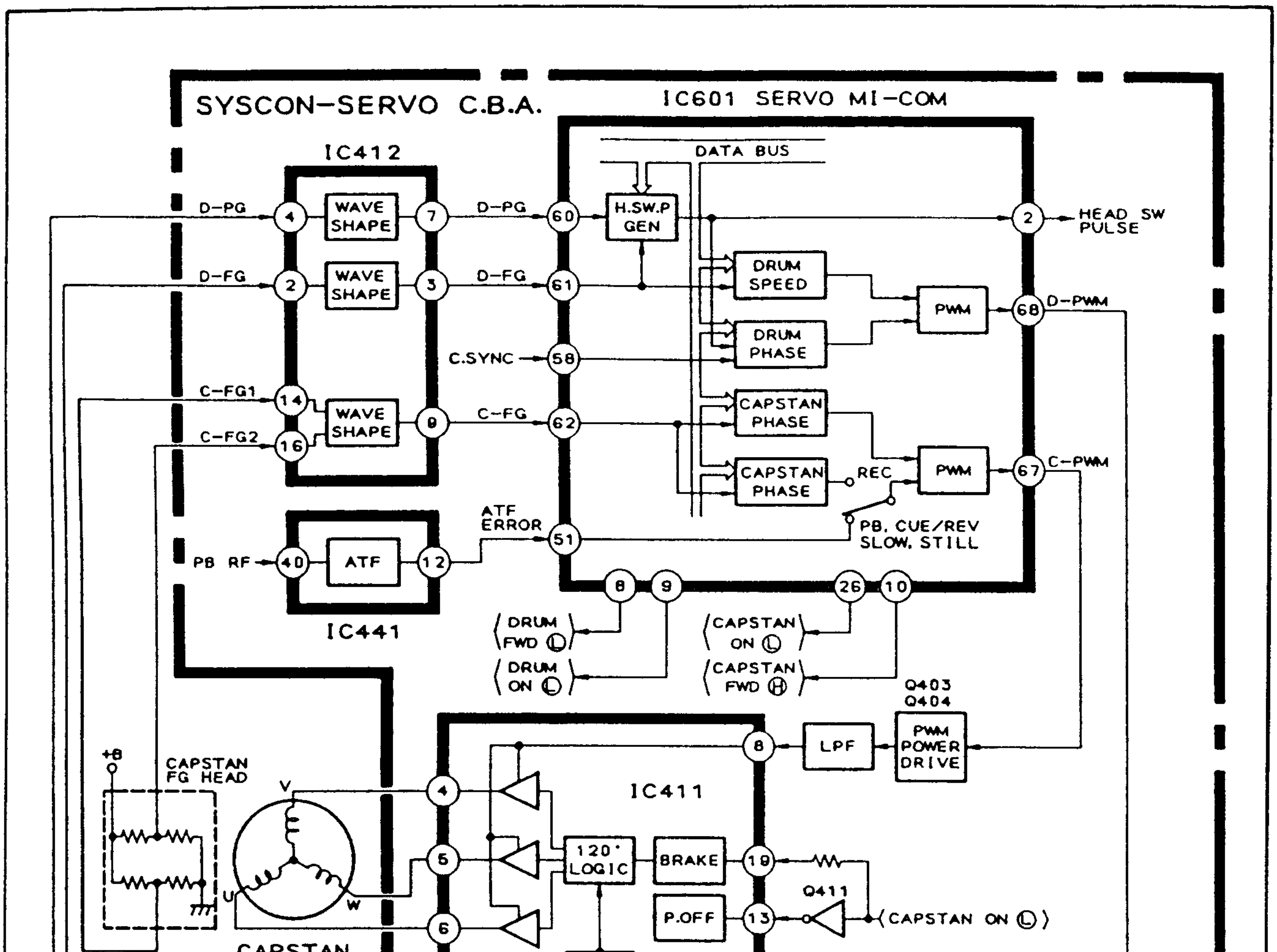

SYSCON-SERVO C.B.A.
IC601 SERVO MI-COM
IC412
DATA BUS
D-PG
WAVE SHAPE
D-PG
H.SW.P GEN
HEAD SW PULSE
D-FG
D-FG
DRUM SPEED
DRUM PHASE
PWM
D-PWM
C.SYNC
C-FG1
C-FG2
C-FG
CAPSTAN PHASE
CAPSTAN PHASE
REC
C-PWM
ATF ERROR
PB. CUE/REV SLOW, STILL
PB RF
ATF
IC441
DRUM FWD Ⓛ
DRUM ON Ⓛ
CAPSTAN ON Ⓛ
CAPSTAN FWD Ⓗ
Q403 Q404
PWM POWER DRIVE
LPF
IC411
120° LOGIC
BRAKE
P.OFF
Q411
CAPSTAN ON Ⓛ
+B
CAPSTAN FG HEAD
CAPSTAN MOTOR
HALL SENSOR ×3
Q401 Q402
SS5V
R432
Q431
C437
DRUM ON Ⓛ
START
DRUM
FG
PG
COM
V
U
W
VL
WL
UL
DRIVE CONTROL
ROTATION LOGIC
DRUM FWD Ⓛ
Q432
DRUM MOTOR
IC431

Fig. I-36

The drum and capstan servoloops are controlled under direction of the servo microcomputer IC601 mounted on SS circuit board. So, the external servocontrol circuit is not provided.
The software servocontrol function is carried out by the servoloop hardware contained in IC.

(1) Drum servocontrol

The minuscule outputs from the FG and PG coils equipped on the drum motor is subjected to waveform shaping in IC412 to provide logical levels (0 to 5V). Then, the logical-level signals are input to the servo microcomputer. In recording/playback, the D-FG signal has a frequency of 600 Hz under normal condition. And, two pulses of D-PG are output per one rotation of the drum.

On receipt of the logical-level signals, the servo microcomputer carries out speed servocontrol and phase servocontrol and then outputs the D-PWM signal from pin 68. The D-PWM signal is subjected to power driving by Q401 and 402 to produce the PWM signal. It is passed through the LPF to provide DC voltage. This DC voltage is applied to the common terminal of motor. The D-PWM signal is also used to start up the motor.

The U/V/W switching of motor is conducted with the signals appearing from pins 3, 22 and 24 of the motor drive circuit (IC431). The counter e.m.f. voltage of motor is detected for switch timing control. For this purpose, pin 14 is assigned to receive input.

The motor is controlled by the DRUM ON Ⓛ signal output from the main microcomputer.
For decelerating/braking, pins 4, 16 and 21 of IC431 are used.

(2) Capstan servocontrol

The FG1 signal from the capstan motor and the FG2 signal having the reverse phase are subjected to waveform shaping by the IC412. Then, these signals are frequency-multiplied (doubled) respectively to provide logical-level inputs to the servo microcomputer. In recording, the frequency is 1,325 Hz (LP: 633 Hz). On receipt of the input signals, the servo microcomputer carries out speed servocontrol and phase servocontrol. For the playback operation, the ATF ERROR signal input to pin 51 is used to conduct phase servocontrol. As in the drum servocontrol sequence, the C-PWM signal (result of servocontrol) is output from pin 67 and then subjected to power driving with Q403 and 404. Then, after passing through the LPF, the DC voltage is input to pin 8 of the motor drive circuit (IC411) and applied to each of motor phases U, V and W.

For the U/V/W switching of motor, the three Hall elements are used to detect the rotor position. Thus, the switching operation is controlled.

The motor is controlled by the CAPSTAN ON Ⓛ signal from the main microcomputer. For decelerating/braking, pin 19 of IC411 is set to high.

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CHAPTER II. DISASSEMBLING/ADJUSTMENTS

1. Before Disassembling/Adjusting

1-1 List of maintenance tools and supplies

1-1-1 Maintenance tools

DESCRIPTION	TOOL NO.	REMARKS
Alignment tape E (MONOSCO)	DY9-1062-000	
Alignment tape G (V DO MASTER)	DY9-1064-000	
Recording current checker	DY9-1056-000	
Y/C mix amplifier	DY9-1079-000	
Extension connector kit	DY9-1092-500	(A1E,F)
Y/C separator	DY9-1093-500	
Extension connector kit	DY9-1097-500	New
Camera Mi-com. adjuster	DY9-1095-000	New
Color bar chart	DY9-2002-000	
Logarithmic gray scale chart	DY9-2005-000	
Adjuster (0.9 mm)	DY9-2020-000	
Phillips screwdriver (bit part only)	DY9-2030-000	
Adjuster (1.8 mm)	DY9-2041-000	
Color chart viewer (5600°K)	DY9-2039-500-220	EUROPE (except U.K.), H.K. etc.
	DY9-2039-500-240	U.K.
Viewer amplifier (5600°K)	DY9-2040-000	
ND-2.0 filter (100 x 100 mm)	DY9-2044-000	

Supplies

DESCRIPTION	TOOL NO.	REMARKS
Screw lock 1401B	CY9-8012-000	
Alonalpha	CY9-8007-000	
Grease GE-C9	CY9-8043-000	
Grease GE-X8	CY9-8044-000	
Grease GE-C4	CY9-8045-000	
Teflon Fluorocarbon Resin MP-102	DY9-3013-000	New
Floil G902	DY9-3017-000	New

Note: For recorder mechanism, refer to the mechanism manual MC-4B (DY8-3391-501 201) separately issued.

1-1-2 List of extension connectors

Use the following extension connectors.

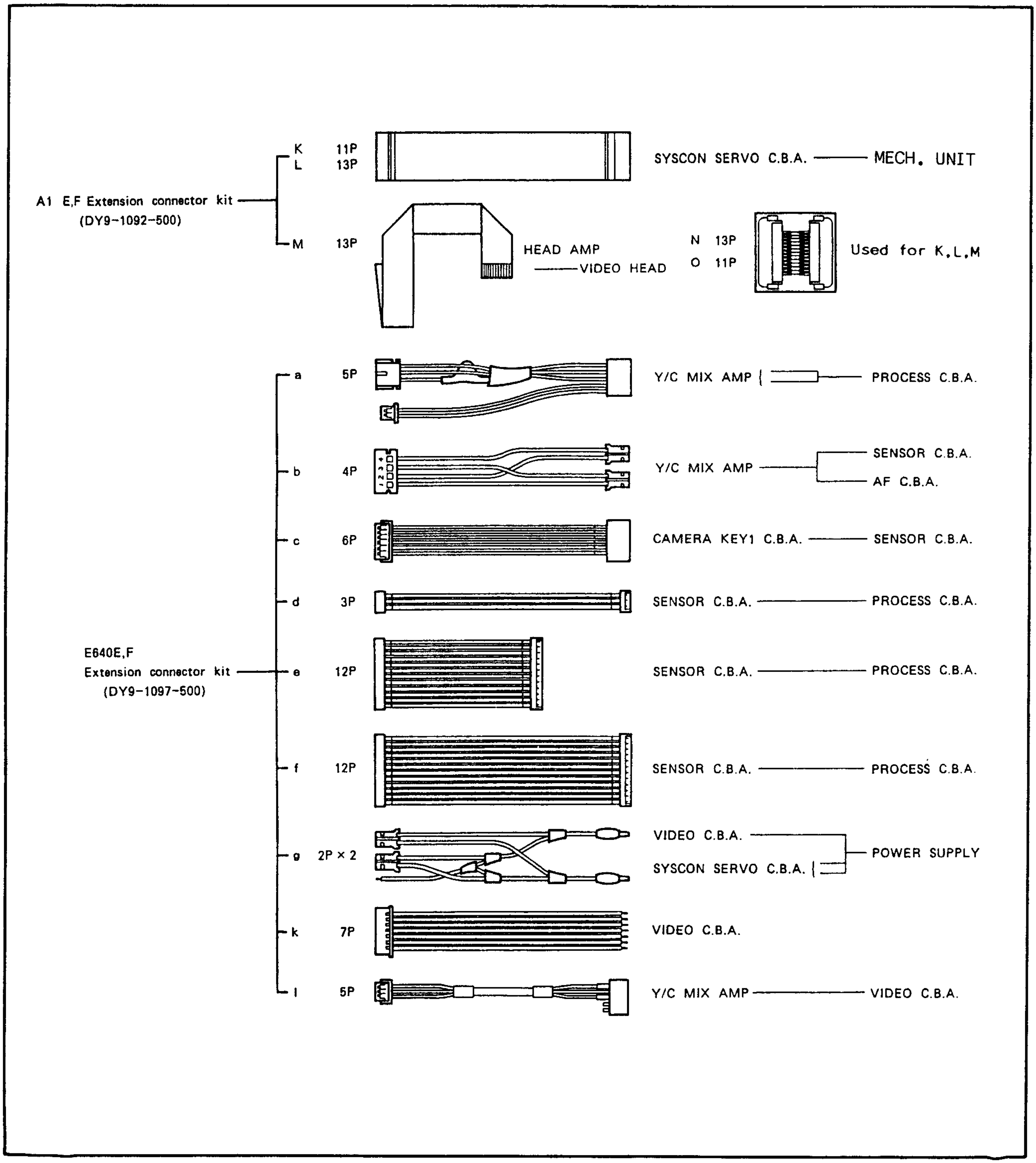

A1 E,F Extension connector kit
(DY9-1092-500)
K 11P
L 13P
SYSCON SERVO C.B.A.
MECH. UNIT
M 13P
HEAD AMP
VIDEO HEAD
N 13P
O 11P
Used for K,L,M
E640E,F
Extension connector kit
(DY9-1097-500)
a 5P
Y/C MIX AMP
PROCESS C.B.A.
b 4P
Y/C MIX AMP
SENSOR C.B.A.
AF C.B.A.
c 6P
CAMERA KEY1 C.B.A.
SENSOR C.B.A.
d 3P
SENSOR C.B.A.
PROCESS C.B.A.
e 12P
SENSOR C.B.A.
PROCESS C.B.A.
f 12P
SENSOR C.B.A.
PROCESS C.B.A.
g 2P × 2
VIDEO C.B.A.
SYSCON SERVO C.B.A.
POWER SUPPLY
k 7P
VIDEO C.B.A.
l 5P
Y/C MIX AMP
VIDEO C.B.A.

Fig. II-1

1-2 Preparation for camera section adjustments

1-2-1 Setting

* Preparation

- ° Y/C mix amplifier (DY9-1079-000)
- ° Extension connector kit (DY9-1097-500)
- ° Camera Mi-Com. adjuster (DY9-1095-000)
- ° Constant voltage supplier (6 V)

- For camera electrical adjustment -

Procedures:

(1) Short-circuit the following test points on the CAMERA-KEY(1) C.B.A.
TP2801 (VD) ↔ TP2802 (CAMERA CS)
TP2804 (GND) ↔ TP2803 (CAMERA ON Ⓛ)
TP2805 (EVER 5 V) ↔ TP2806 (CAMERA 5 V)

(2) To take out a shield case, unsolder three setscrews.

(3) Connect a Y/C Mix Amplifier by using extension connectors a and b.

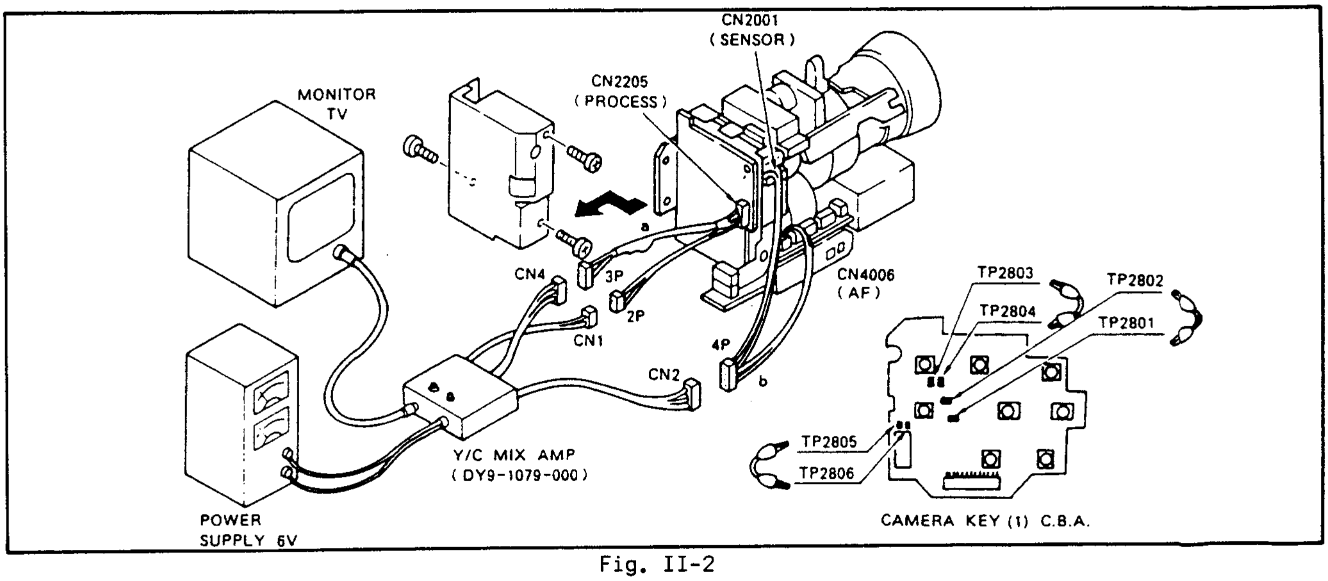

CN2001
(SENSOR)
CN2205
(PROCESS)
MONITOR
TV
a
CN4
3P
2P
CN1
4P
b
CN2
CN4006
(AF)
TP2803
TP2802
TP2804
TP2801
TP2805
TP2806
Y/C MIX AMP
(DY9-1079-000)
POWER
SUPPLY 6V
CAMERA KEY (1) C.B.A.

Fig. II-2

- For camera Mi-Com. adjustment -

Procedure:

(1) Connect a Camera Mi-com. Adjuster as follows.

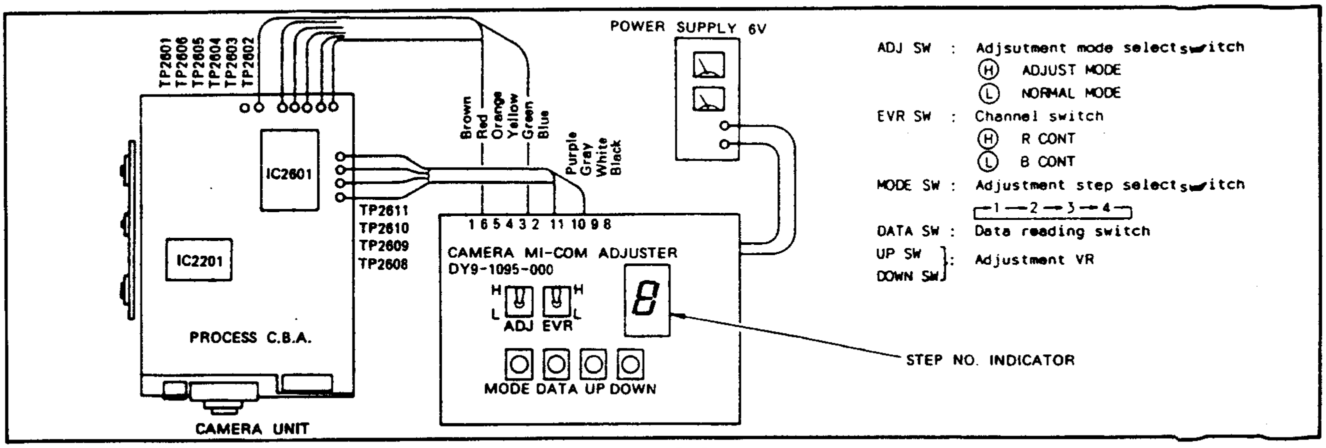

TP2801
TP2806
TP2805
TP2804
TP2803
TP2802
IC2601
IC2201
PROCESS C.B.A.
CAMERA UNIT
TP2611
TP2610
TP2609
TP2608
Brown
Red
Orange
Yellow
Green
Blue
Purple
Gray
White
Black
1 6 5 4 3 2 11 10 9 8
POWER SUPPLY 6V
CAMERA MI-COM ADJUSTER
DY9-1095-000
H
L
ADJ
EVR
H
L
MODE DATA UP DOWN
STEP NO. INDICATOR
ADJ SW : Adjsutment mode selectswitch
Ⓗ ADJUST MODE
Ⓛ NORMAL MODE
EVR SW : Channel switch
Ⓗ R CONT
Ⓛ B CONT
MODE SW : Adjustment step selectswitch
1 → 2 → 3 → 4
DATA SW : Data reading switch
UP SW
DOWN SW : Adjustment VR

Fig. II-3

1-2-2 How to open C.B.A.s of camera section

Procedures:

(1) To detach the DIGITAL MEMORY, the CAMERA KEY(1) and the PROCESS C.B.A.s, remove a screw indicated in the Fig. II-4.

(2) Connect each C.B.A. as in the Fig. II-4 with extension connectors c, d, e and f.

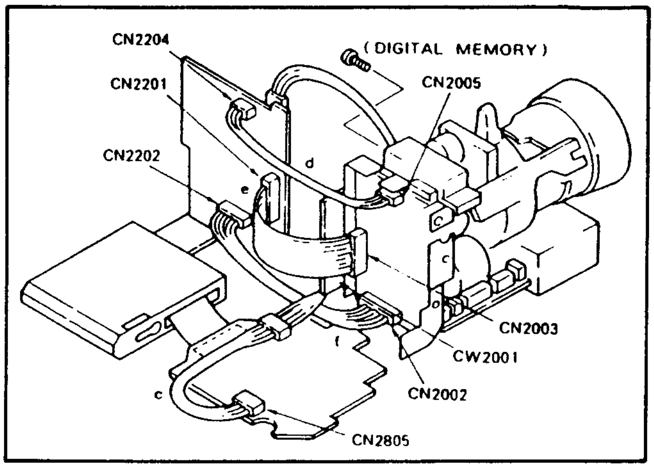

CN2204
CN2201
CN2202
(DIGITAL MEMORY)
CN2005
d
e
c
c
CN2003
CW2001
CN2002
f
c
CN2805

Fig. II-4

1-2-3 Charts for adjustment

(1) Fixture (attached to Service Manual for A1E,F)

Used for the blooming adjustment. Set the fixture onto the front face of lens, and attach each filter.

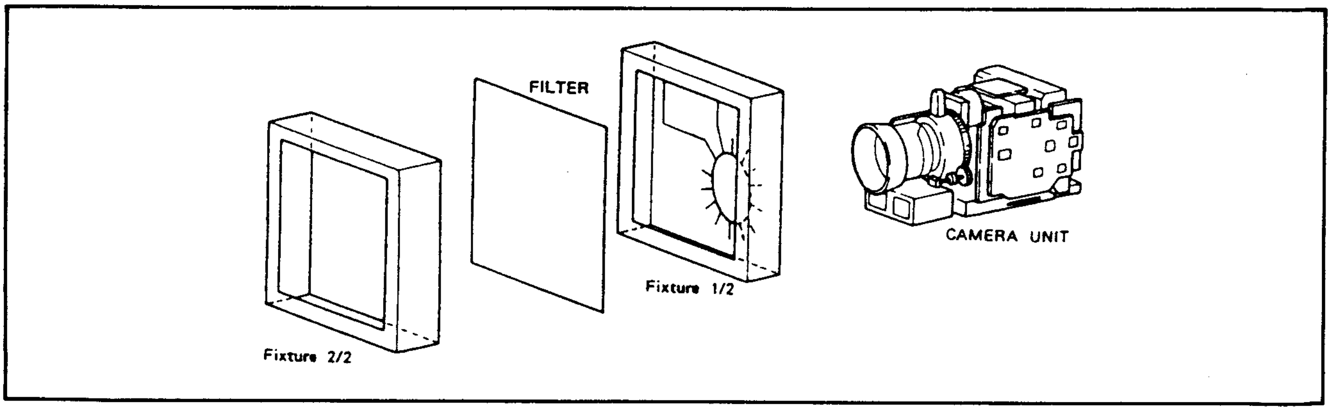

FILTER
Fixture 1/2
Fixture 2/2
CAMERA UNIT

Fig. II-5

(2) U-chart

1) Prepare by cutting a U-pattern off from the center of black paper. Size is detailed in the Fig. II-6.

2) ⧖ marks indicate the standard picture frame.

* Note: For the blooming adjustment, attach a piece of white paper onto the rear side.

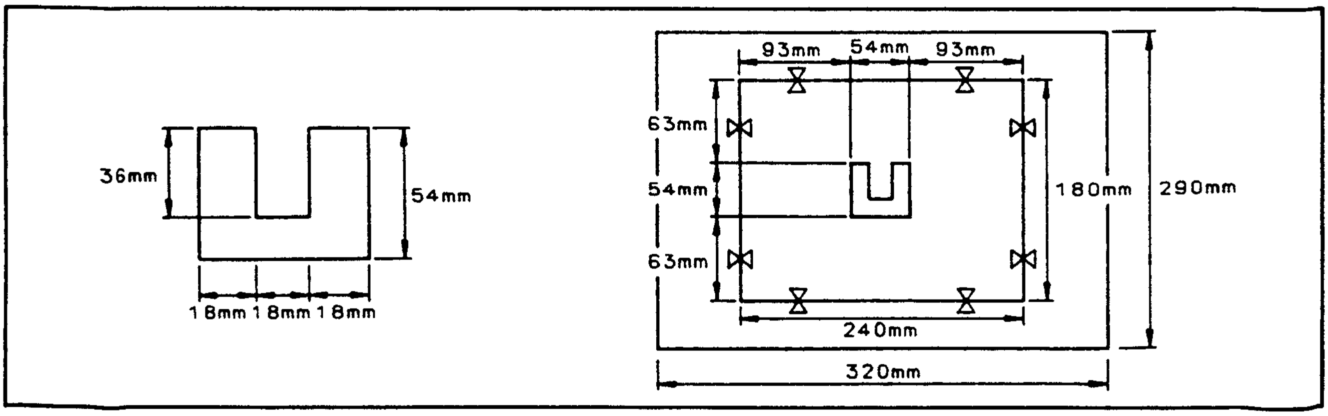

36mm
54mm
18mm 18mm 18mm
93mm
54mm
93mm
63mm
54mm
63mm
180mm
290mm
240mm
320mm

Fig. II-6

1-2-4 Other precautions

(1) Prior to adjustment, energize the equipment for 3 minutes or longer.

(2) Set the light box at color temperature 5600°K.

(3) "Standard angle of view"

- ° The "standard angle of view" is given when the charts displayed so as to meet the maximum screen of the full scan monitor.
- ° With an oscilloscope, adjust the grayscale (36 µs) and the color bar (52 µs), followed by shooting.
- ° Shoot the white chart at its center.
- ° Unless otherwise specified, shooting distance must be about 1.4 m.

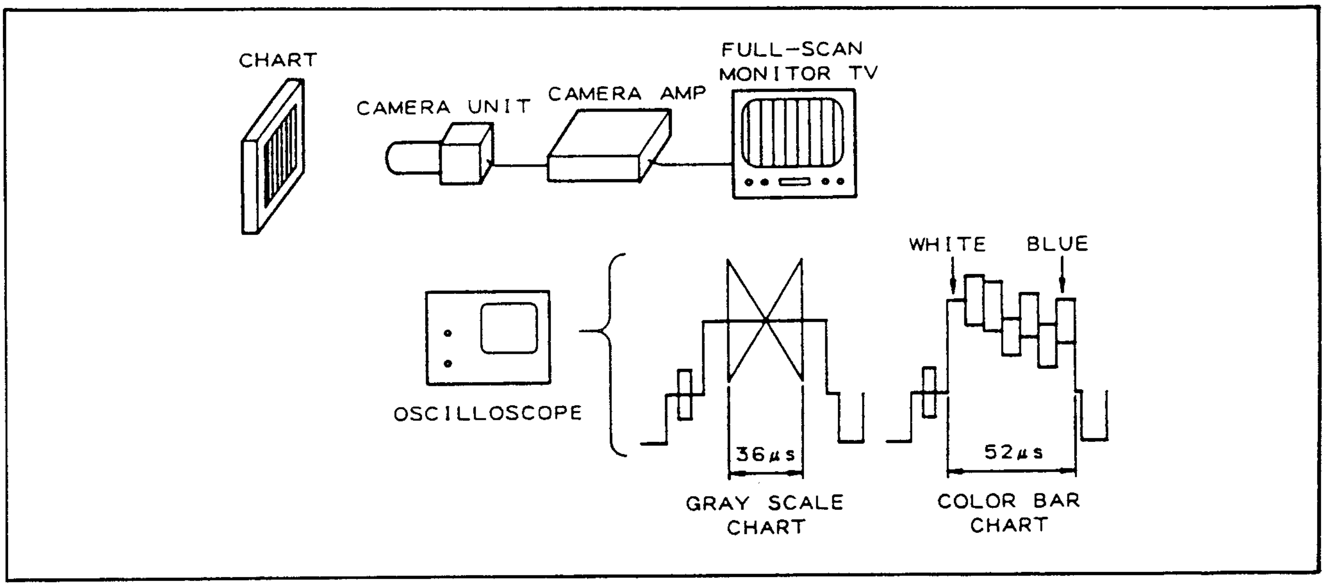


CHART
CAMERA UNIT
CAMERA AMP
FULL-SCAN MONITOR TV
OSCILLOSCOPE
36µs
GRAY SCALE CHART
WHITE
BLUE
52µs
COLOR BAR CHART

Fig. II-7

1-3 Preparation for recorder section adjustments

1-3-1 Settings

* Preparation

- ° Y/C separator (DY9-1093-500)
- ° Extension connector kit (DY9-1097-500) g, l
- ° Constant voltage supplier (6 V)

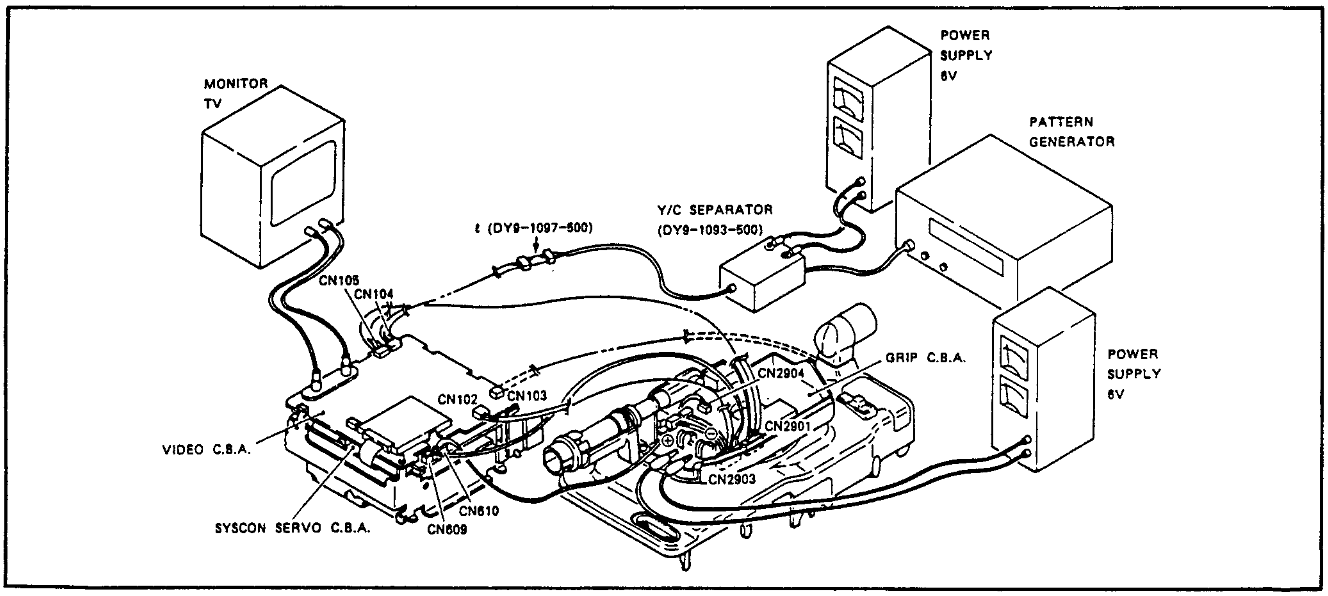
1) - For recorder section adjustment I (setting for character display) -

Procedure:

(1) Connect each prepared devices as illustrated in the Fig. II-8

* Notes: 1. In case that the character display (monitor TV) is not necessary, refer to "For recorder section adjustment II" below.

2. To check the AUDIO system, plug the microphone.



MONITOR TV
POWER SUPPLY 6V
PATTERN GENERATOR
Y/C SEPARATOR (DY9-1093-500)
ℓ (DY9-1097-500)
CN105
CN104
CN102
CN103
CN2904
GRIP C.B.A.
CN2901
CN2903
POWER SUPPLY 6V
VIDEO C.B.A.
SYSCON SERVO C.B.A.
CN610
CN609

Fig. II-8

2) - For recorder section adjustment II -
(for adjustments without character display)

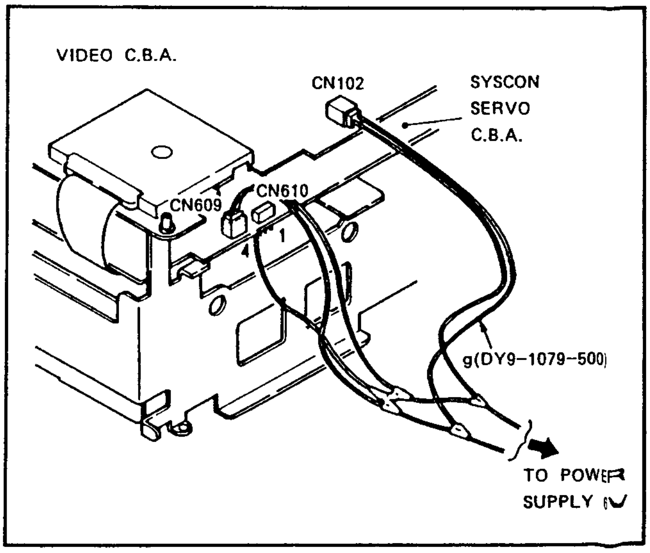
Procedure:

(1) Connect each prepared devices as illustrated in the Fig. II-9.

* Notes: 1. This setting does not require the GRIP C.B.A.

2. As the character generator is connected with the GRIP C.B.A., character is not displayed by this setting.

3. As the VR for the battery voltage dropout adjustment is on the GRIP C.B.A., supply a voltage to pin 4 of CN610 (SS C.B.A.) with an extension connector g.



VIDEO C.B.A.
CN102
SYSCON SERVO C.B.A.
CN609
CN610
4
1
g(DY9-1079-500)
TO POWER SUPPLY 6V

Fig. II-9

3) - For tape transport adjustment -

Procedure:

(1) Set up the state explained in the "2) For the recorder adjustment II".

(2) By using extension connector k, pick up PB-RF, SHIFT and TRACK SHIFT signals for each adjustment.

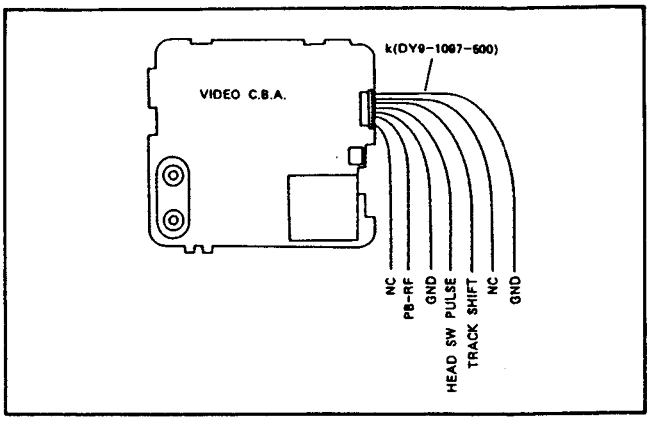

k(DY9-1097-600)
VIDEO C.B.A.
NC
PB-RF
GND
HEAD SW PULSE
TRACK SHIFT
NC
GND

Fig. II-10

1-3-2 How to open C.B.A.s of recorder section

1) VIDEO C.B.A.

Procedure:

(1) Remove two screws to open the C.B.A.

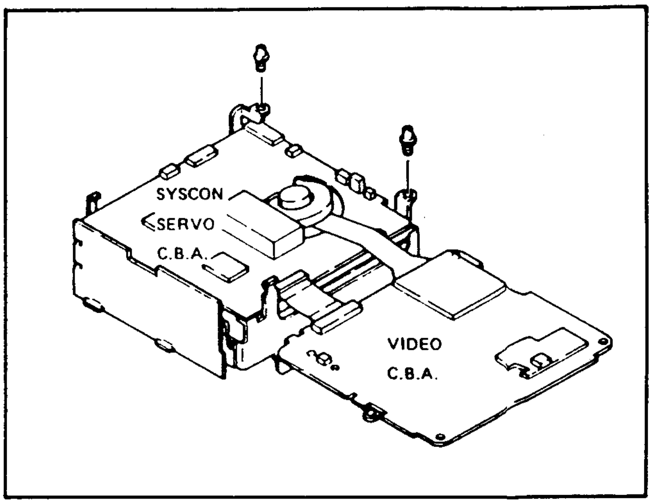

SYSCON
SERVO
C.B.A.
VIDEO
C.B.A.

Fig. II-11

2) SYSCON-SERVO C.B.A.

Procedure:

(1) Remove four screws. Then, open the C.B.A. with the following connectors.

K: T-reel extension cable (11p)
L: S-reel extension cable (13p)
M: Drum extension cable (13p)
N: L, M connectors
O: K connector

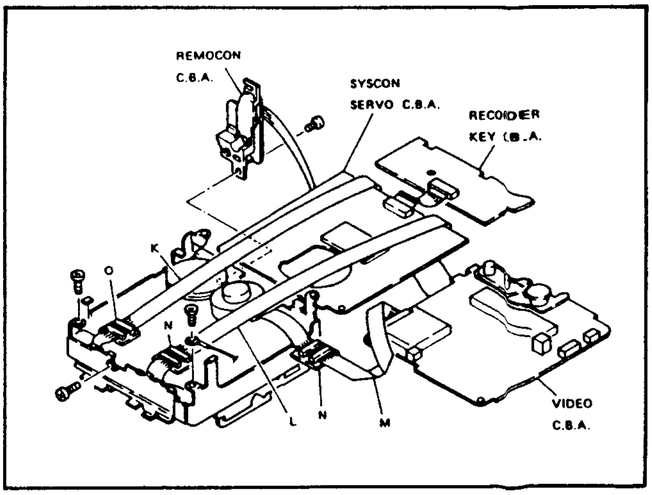

REMOCON
C.B.A.
SYSCON
SERVO C.B.A.
RECORDER
KEY C.B.A.
K
O
N
L
N
M
VIDEO
C.B.A.

Fig. II-12

1-3-3 Service modes

Service modes are provided for adjustments/operation checks. Activate each mode with the recorder and the EVF connected for the purpose of character display.

(1) Transition to service modes

Mode is switched over when the pattern of wireless remote controller (WL-100, WL200, WL-E80) is shorted.

NORMAL → S 1-1 → S 1-2 → SERVICE 01 →
SERVICE 02 → SERVICE 03 → SEVICE 04 →
NORMAL

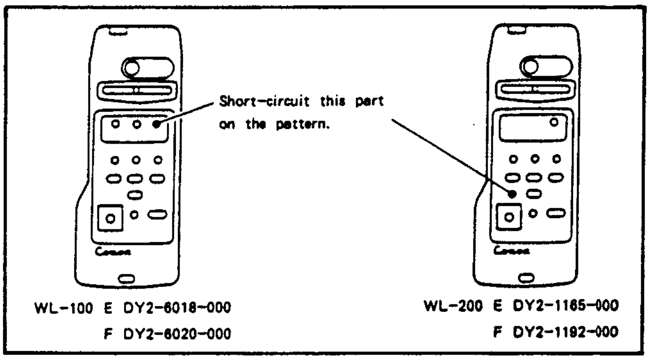
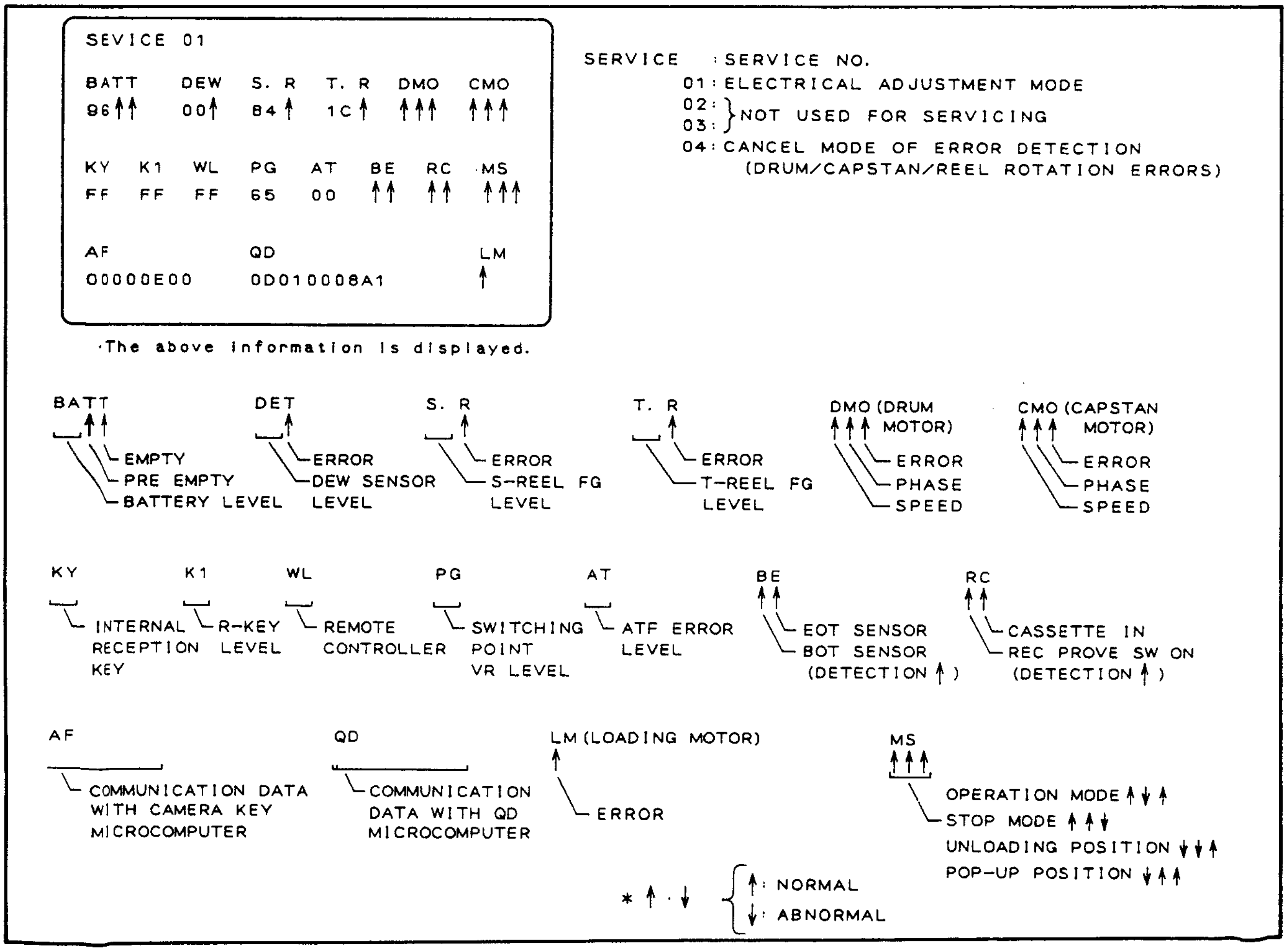


Fig. II-13

(2) Function of service mode

S 1-1, S 1-2 (for tape transport adjustment) * Refer to the MC-4B Service Manual.

In this mode, no information character is displayed on EVF screen.
Instead, POWER LED lamp flashes at certain interval of seconds.
° S 1-1 75% tracking, 220° envelop output mode
Power LED lamp flashes in every 1 sec.
° S 1-2 100% tracking, 220° envelope output mode
Power LED lamp flashes in every 2 sec.



```
SEVICE 01

BATT   DEW   S. R   T. R   DMO   CMO
96↑↑   00↑   84 ↑   1C ↑   ↑↑↑   ↑↑↑

KY   K1   WL   PG   AT   BE   RC   MS
FF   FF   FF   65   00   ↑↑   ↑↑   ↑↑↑

AF          QD               LM
00000E00    0D010008A1       ↑
```

·The above information is displayed.

SERVICE : SERVICE NO.
01 : ELECTRICAL ADJUSTMENT MODE
02 :, 03 : } NOT USED FOR SERVICING
04 : CANCEL MODE OF ERROR DETECTION (DRUM/CAPSTAN/REEL ROTATION ERRORS)

BATT ↑↑ — EMPTY, PRE EMPTY, BATTERY LEVEL
DET ↑ — ERROR, DEW SENSOR LEVEL
S. R ↑ — ERROR, S-REEL FG LEVEL
T. R ↑ — ERROR, T-REEL FG LEVEL
DMO (DRUM MOTOR) ↑↑↑ — ERROR, PHASE, SPEED
CMO (CAPSTAN MOTOR) ↑↑↑ — ERROR, PHASE, SPEED

KY — INTERNAL KEY
K1 — R-KEY RECEPTION LEVEL
WL — REMOTE CONTROLLER
PG — SWITCHING POINT VR LEVEL
AT — ATF ERROR LEVEL
BE ↑↑ — EOT SENSOR, BOT SENSOR (DETECTION ↑)
RC ↑↑ — CASSETTE IN, REC PROVE SW ON (DETECTION ↑)

AF — COMMUNICATION DATA WITH CAMERA KEY MICROCOMPUTER
QD — COMMUNICATION DATA WITH QD MICROCOMPUTER
LM (LOADING MOTOR) ↑ — ERROR
MS ↑↑↑ — OPERATION MODE ↑↓↑
STOP MODE ↑↑↓
UNLOADING POSITION ↓↓↑
POP-UP POSITION ↓↑↑

* ↑ · ↓ { ↑ : NORMAL
↓ : ABNORMAL }

Fig. II-14

2. Disassembling

2-1 Removal/reassembling of covers

2-1-1 Removal of finder assembly, EVF ring, microphone, AV cap and battery cover

(1) Detach the finder assembly, EVF ring, the microphone, the AV cap and the lithium battery cover.

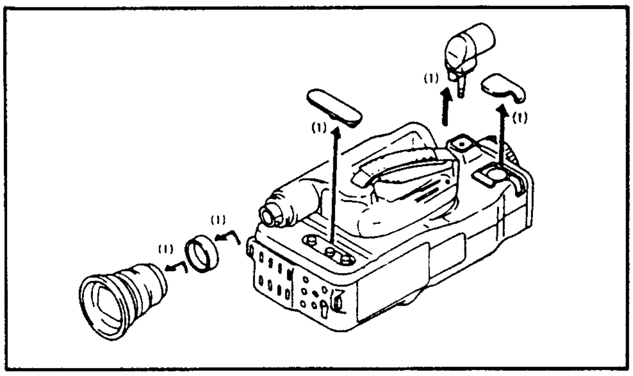


Fig. II-15

2-1-2 Removal of cassette cover

(1) To remove two screws ⓐ, peel off two cassette cover seals.
(2) Detach the cassette cover.

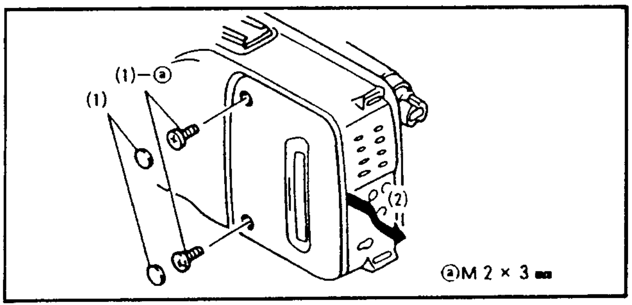


Fig. II-16

2-1-3 Removal of left grip cover

(1) To remove two screws ⓑ of the rear side, turn the grip downward by 90°.
(2) Remove two screws ⓑ of the front side.
(3) Detach the left grip cover.

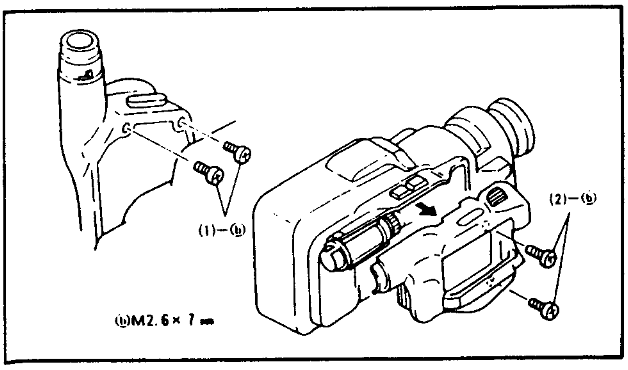


Fig. II-17

2-1-4 Removal of lens cover

(1) Remove two screws ⓒ and ⓓ.

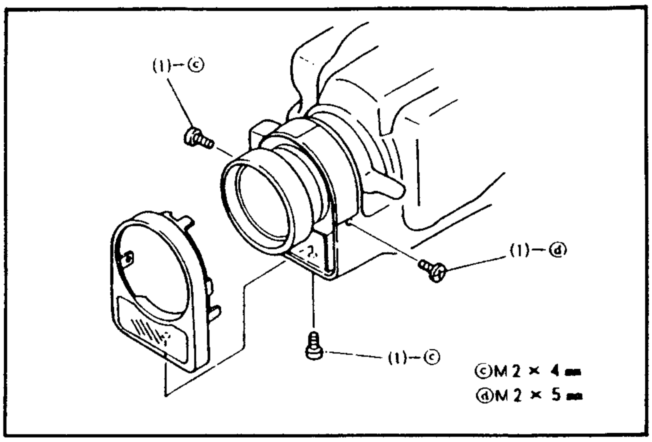


Fig. II-18

2-1-5 Removal of left cover

(1) To remove a screw ⓔ, turn the grip a little as shown in the figure.
(2) Remove four screws ⓔ, two screws ⓒ, two screws ⓓ.
(3) Unplug four connectors between the GRIP C.B.A. and the main unit.
(4) While pulling out the connectors unplugged in the step (3) from the hole of the grip, detach the left cover.
(5) Unplug a connector between the DIGITAL MEMORY C.B.A. and the lithium battery.

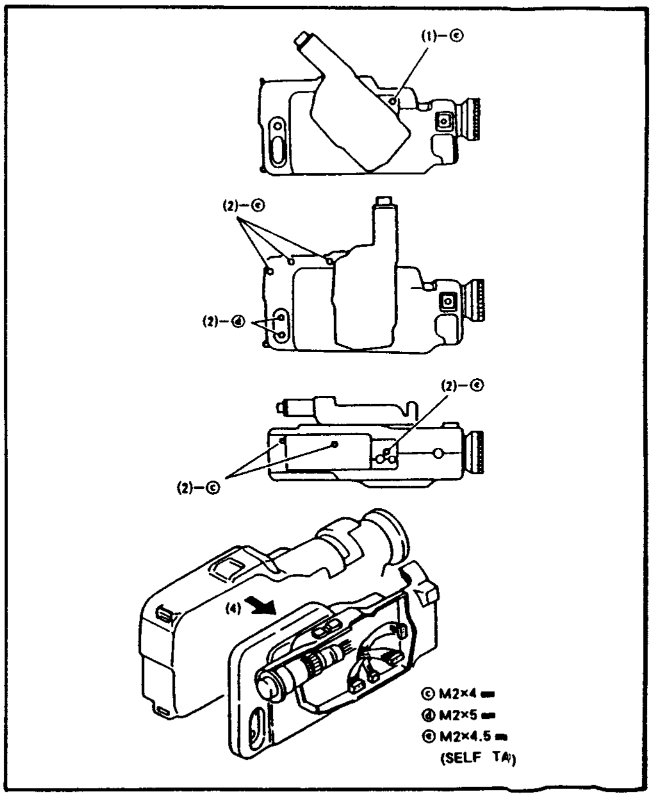


Fig. II-19

2-1-6 Removal of right cover

(1) Remove two screws ⓔ and a screw ⓒ.
(2) While exerting upward force to the right cover and downward force to the top cover respectively (part Ⓐ), pull up and detach the right cover from the bottom part.

* Note: Be careful not to damage the parts Ⓐ and Ⓑ when detaching/reassembling.

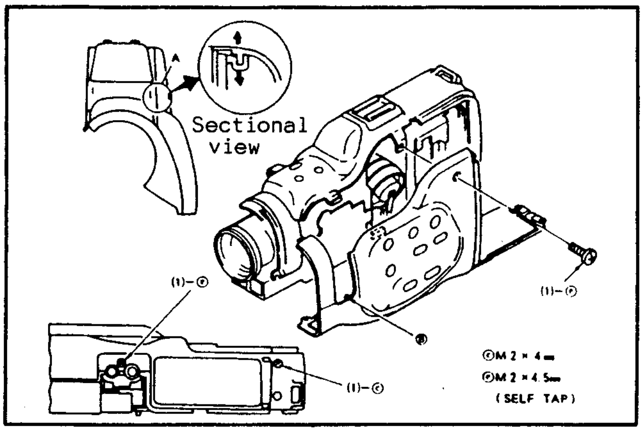

A
Sectional view
(1)-ⓔ
(1)-ⓔ
Ⓑ
(1)-ⓒ
ⓒM 2 × 4mm
ⓔM 2 × 4.5mm
(SELF TAP)

Fig. II-20

2-1-7 Removal of top cover

(1) While opening the rear cover a little, turn the zoom lever fully toward the telephoto end direction.

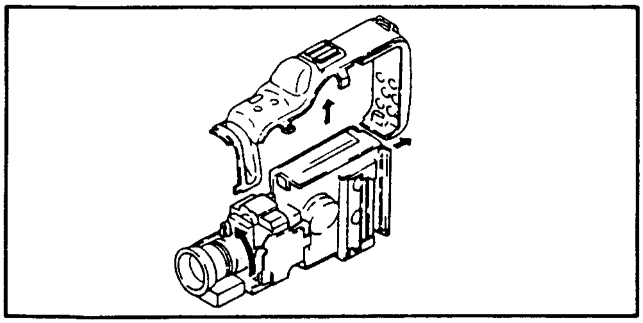


Fig. II-21

2-1-8 Removal of camera and lens units

(1) Remove a screw ⓕ.
(2) Unplug a connector between the camera and the recorder units.

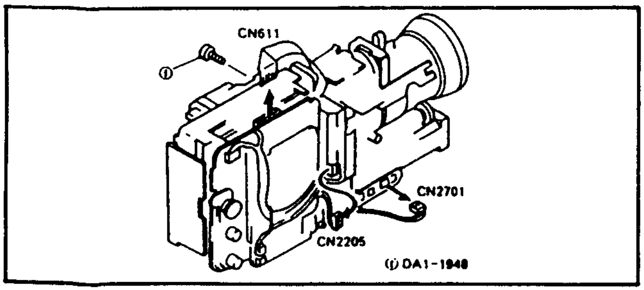

CN611
ⓕ
CN2701
CN2205
ⓕ DA1-1948

Fig. II-22

2-1-9 Removal of GRIP C.B.A.

(1) Remove three screws ⓖ.
(2) Take out the GRIP C.B.A.

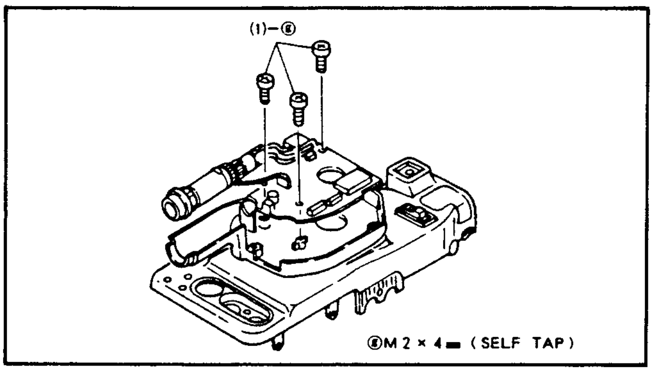

(1)-ⓖ
ⓖM 2 × 4mm (SELF TAP)

Fig. II-23

2-1-10 Removal of grip right cover

(1) Remove three screws ⓗ.
(2) Detach the grip right cover.

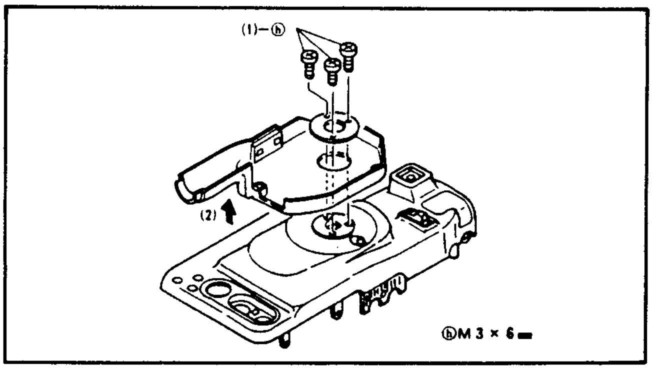


Fig. II-24

2-1-11 Removal of rear cover

(1) Remove two screws ⓔ.
(2) Detach the rear cover.

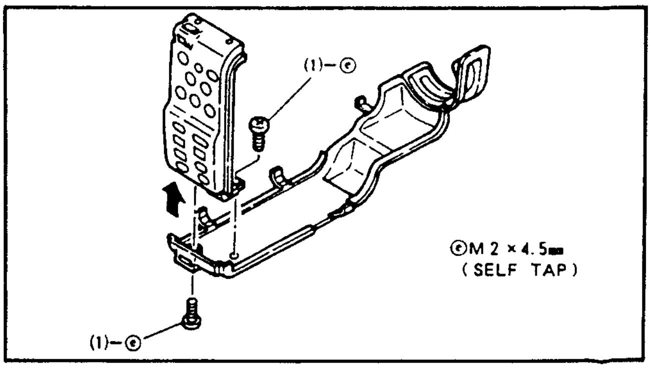

(1)-ⓔ
ⓔM 2 × 4.5mm
(SELF TAP)
(1)-ⓔ

Fig. II-25

2-2 Disassembling of camera section

2-2-1 Removal of CAMERA KEY(1), (2) C.B.A.s

(1) To detach the CAMERA-KEY(2) C.B.A., unhook two claws Ⓐ.
(2) Unhook the claw Ⓑ, and unplug the CN2802, 2804 and 2805 to detach the CAMERA-KEY(1) C.B.A.

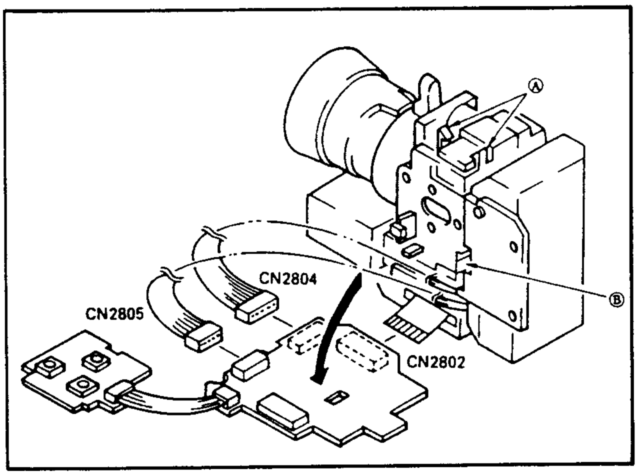

Ⓐ
CN2804
CN2805
Ⓑ
CN2802

Fig. II-26

2-2-2 Removal of PROCESS C.B.A.

(1) Remove three screws ⓐ.
(2) Detach the shield case.
(3) Unplug the CN2203.
(4) While pushing the DIGITAL MEMORY C.B.A. downward, unplug the CN2206. Then, detach the PROCESS C.B.A.

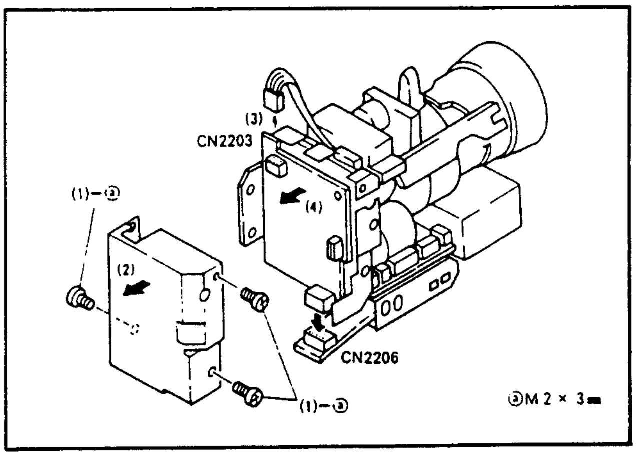

(3)
CN2203
(1)-ⓐ
(4)
(2)
CN2206
(1)-ⓐ
ⓐM 2 × 3㎜

Fig. II-27

2-2-3 Removal of DIGITAL MEMORY C.B.A. and DC/DC converter

(1) Remove a screw ⓐ.
(2) Detach the DIGITAL MEMORY C.B.A.
(3) Unplug the CN2204.
(4) To detach the DC/DC converter, unhook the claw Ⓐ.

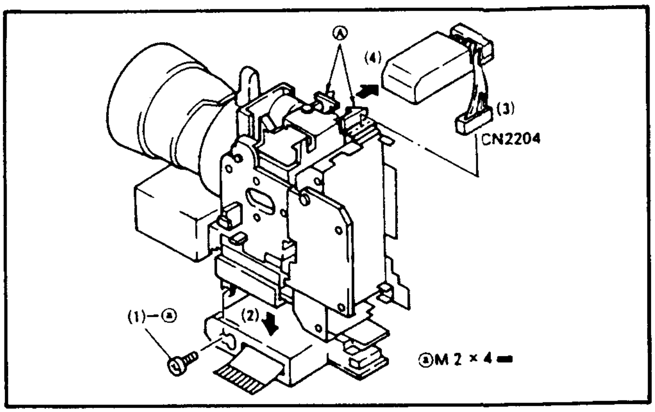

Ⓐ
(4)
(3)
CN2204
(1)-ⓐ
(2)
ⓐM 2 × 4㎜

Fig. II-28

2-2-4 Removal of camera holder

(1) Remove two screws ⓘ.
(2) Detach the camera holder.

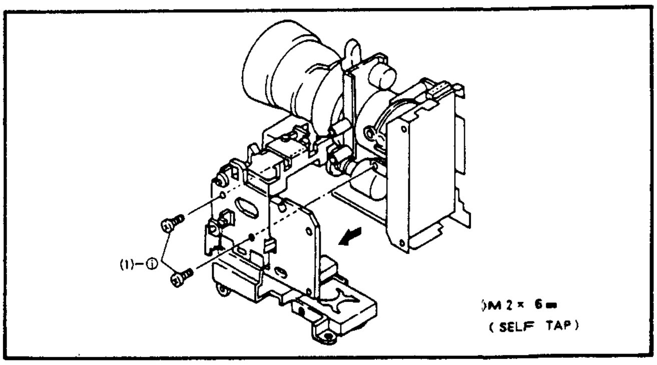

(1)-ⓘ
ⓘM 2 × 6㎜
(SELF TAP)

Fig. II-29

2-2-5 Separation of SENSOR C.B.A., CCD and lens unit

(1) Unplug the CN2001.
(2) Remove a screw ⓘ and two screws ⓙ.
(3) Detach the lens unit.
(4) Unsolder the pins of CCD.
(5) To detach the SENSOR C.B.A., remove two screws ⓐ and then unsolder the three parts Ⓐ of the shield case.
(6) To detach the CCD, remove two screws ⓙ.

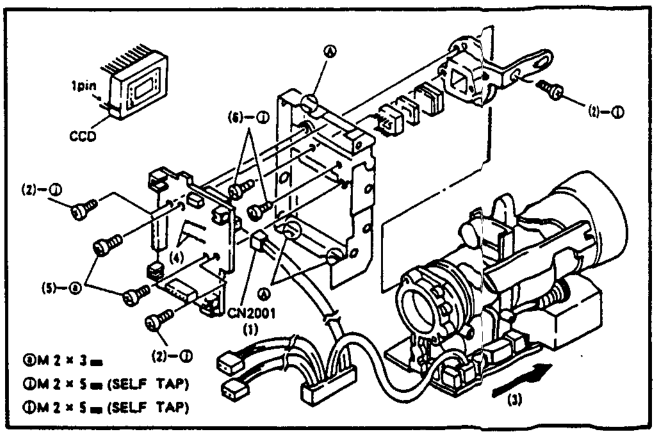

Ⓐ
1pin
CCD
(6)-ⓙ
(2)-ⓘ
(2)-ⓙ
(4)
(5)-ⓐ
Ⓐ
CN2001
(1)
(2)-ⓙ
(3)
ⓐM 2 × 3㎜
ⓘM 2 × 5㎜ (SELF TAP)
ⓙM 2 × 5㎜ (SELF TAP)

Fig. II-30

2-3 Disassembling of lens section

2-3-1 Removal of AF and SW C.B.A.s

(1) Unplug the following connectors.
AF C.B.A. ←→ PZ motor
AF C.B.A. ←→ AF motor
AF C.B.A. ←→ SPC C.B.A.
AF C.B.A. ←→ IRED C.B.A.
AF C.B.A. ←→ SW C.B.A.
(2) Remove two screws ⓚ and ⓛ.
(3) Detach AF and SW C.B.A.s.

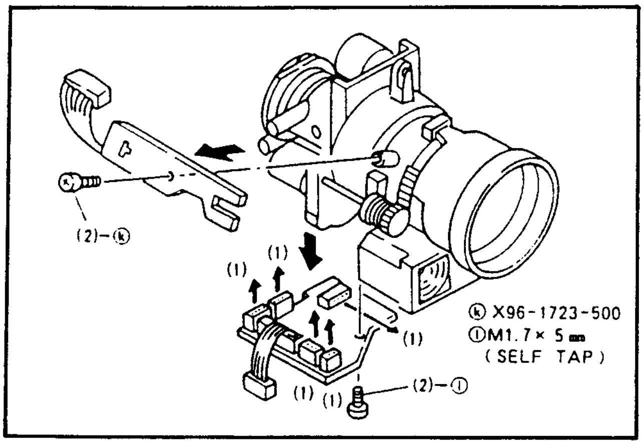


Fig. II-31

2-3-2 Removal of AF and PZ motors

(1) Remove two screws ⓜ.
(2) Detach the AF and PZ motors.

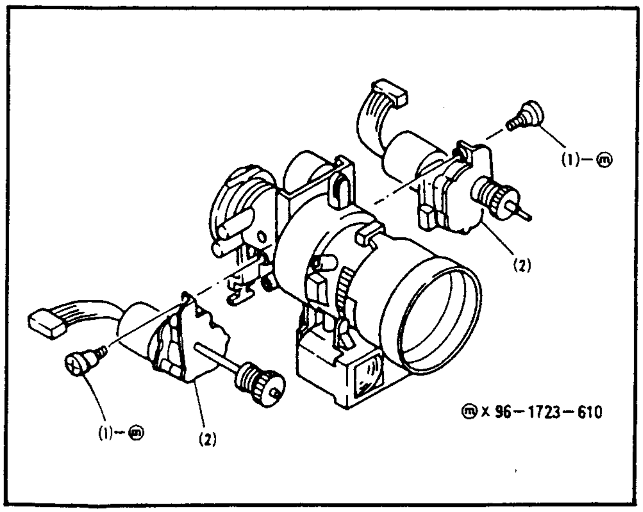


Fig. II-32

2-3-3 Removal of AF block

(1) Remove two screws ⓝ.
(2) Detach the AF block.
* Notes: 1. When remounting the AF block, make sure that the focusing ring cam surface Ⓐ is interlocked with the prism arm Ⓑ properly.
2. Do not loosen the screws securing the SPC and IRED C.B.A.s.
3. After remounting the AF block, be sure to perform the AF distance measuring adjustment (3-2).

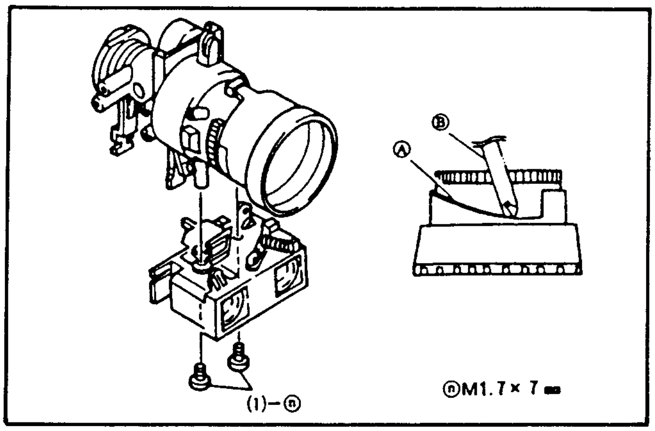


Fig. II-33

2-3-4 Removal of relay lens assembly

(1) Remove a screw ⓞ.
(2) Detach the relay lens assembly.

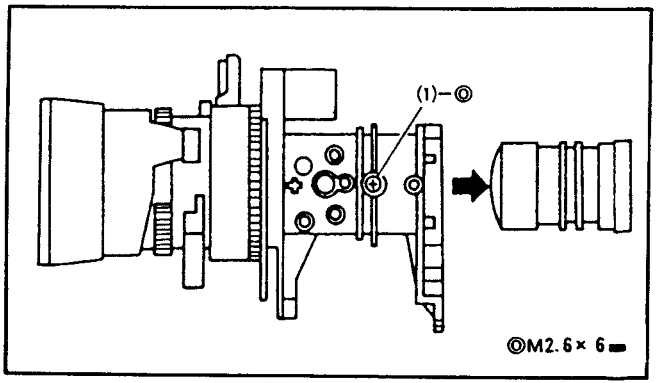


Fig. II-34

2-3-5 Removal of IG meter assembly

(1) Remove a screw ⓟ.
(2) Detach the IG meter downward.
*Note: When detaching/attaching, be careful not to deform the diaphragm blades. As the diaphragm blades are likely to come off from the dowel, check that they are secured completely.

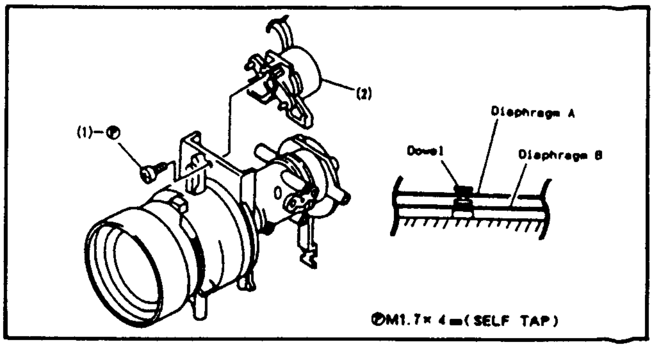


Fig. II-35

2-3-6 Removal of diaphragm blades A and B

(1) Remove the IG meter.
(2) Align the part ⓐ of diaphragm blade A with its dowel position, and then detach the diaphragm blade A.
(3) Also, detach the diaphragm blade B in the same manner.

* Note: Be extremely careful not to bend or contaminate the diaphragm blades. Also, do not touch them with bare hand or fingers.

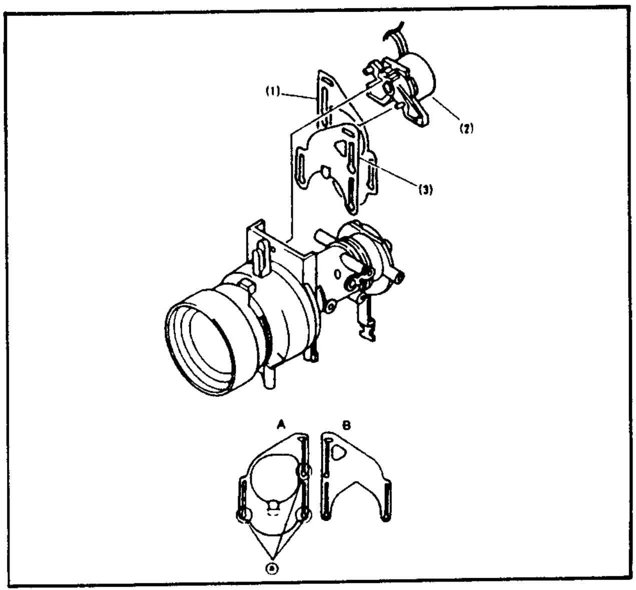


Fig. II-36

2-3-7 Removal of zoom sheet

(1) Peel off the zoom sheet with a pair of tweezers or the like.

* Note: When reattaching the zoom sheet, take care not to have it creased or kinked.

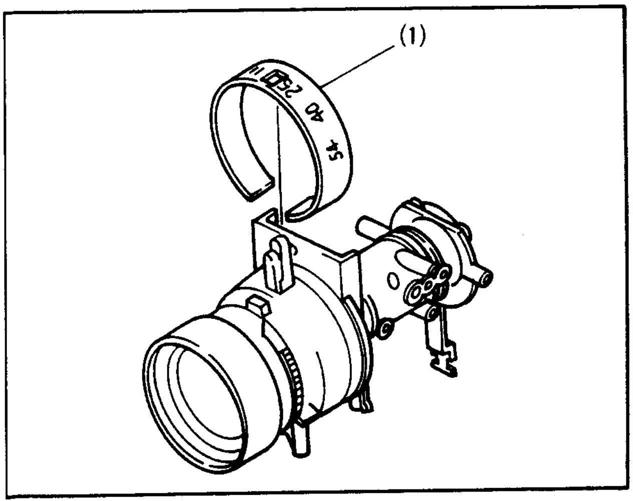


Fig. II-37

2-3-8 Separation of zoom section

(1) To detach the N stopper, remove a screw ⓠ.
(2) Dismount the focus lens assembly.
(3) Remove three screws ⓡ with the relay holder Ⓓ and the fixed lens barrel Ⓐ connected.
(4) Turn the focus side up.
(5) Set the zoom ring to the telephot-end position. Then, pull up the fixed lens barrel Ⓐ straight gradually.
(6) Unhook the claw of zoom ring Ⓑ from the cam ring Ⓒ. Then, pull up the zoom ring Ⓑ straight gradually.
(7) Remove two screws ⓢ.

* Note: When reassembling, check the size of screws.

(8) Pull up the cam ring Ⓒ straight.

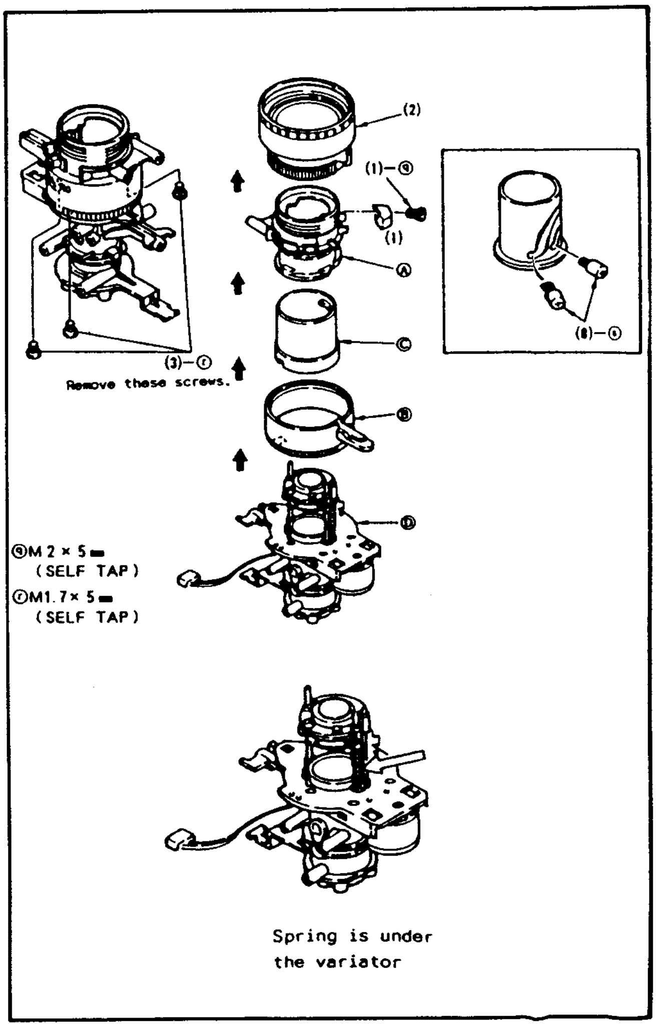


Fig. II-38

2-3-9 Reassembling of zoom ring

(1) Put the cam ring on the relay holder. Then secure them with two screws ⓞ.

* Note: Check that the plate springs are positioned properly.

(2) Install the zoom ring while engaging the claw of zoom ring with the cam ring.

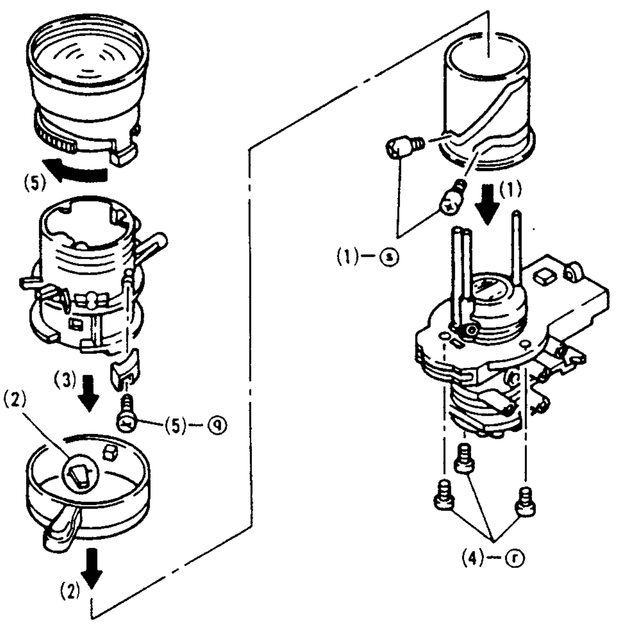
(3) Mount the fixed lens barrel.

* Note: When mounting, set the zoom ring at the telephoto-end position. Also, set three zoom bars into the holes of fixed lens barrel completely.

(4) Secure the relay holder and the fixed lens barrel with three screws ⓢ.

(5) Mount the focus lens assembly. Then, secure the N stopper with a screw ⓝ.

(6) Perform the operational checks and the AF distance measuring adjustment.



ⓡ M1.7×6㎜ (SELF TAP)
ⓠ M2×5㎜ (SELF TAP)

Fig. II-39

2-3-10 Oil/grease/bond application positions

After cleaning, replacement, etc., apply the followings to the indicted positions in the Fig. II-40.

1. Grease GE-X8 (CY9-8044-000)
2. Grease GE-C4 (CY9-8045-000)
3. Instantaneous adhesive Alonalpha (CY9-8007-000)
4. Floil G902 (DY9-3017-000)
5. Teflon Fluorocarbon Resin MP-102 (DY9-3013-000)

* Note: use the above MP-102 with GE-C4. Weight ratio is as follows.
MP-102 : GE-C4
3 : 10

6. Grease GE-C9 (CY9-8043-000)

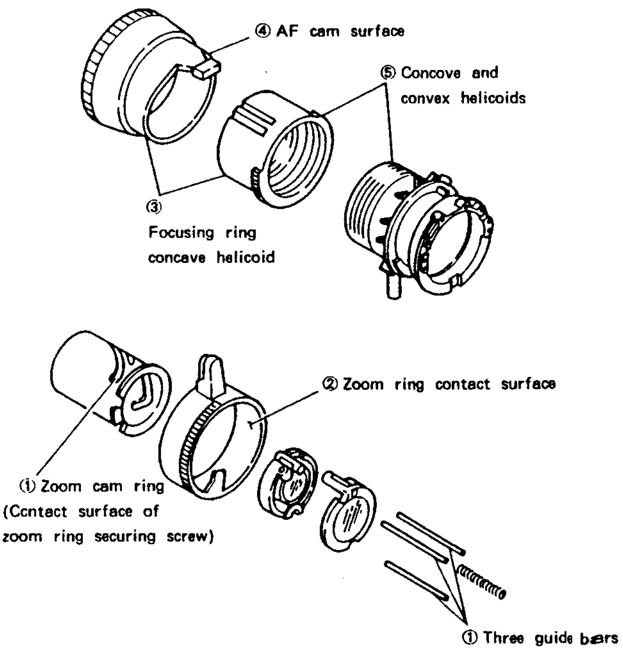
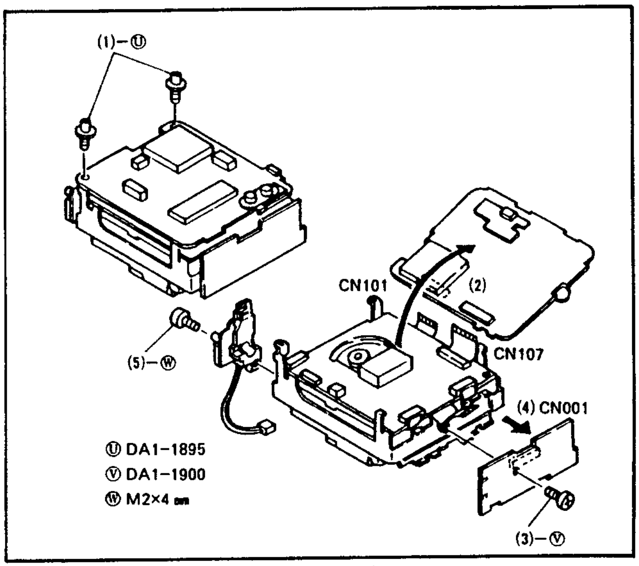

④ AF cam surface
⑤ Concove and convex helicoids
③ Focusing ring concave helicoid
② Zoom ring contact surface
① Zoom cam ring (Ccntact surface of zoom ring securing screw)
① Three guide bars

Fig. II-40

2-4 Disassembling of recorder section

2-4-1 Removal of AUDIO-CHORMA, VIDEO, RECORDER-KEY and REMOCON C.B.A.s

(1) Remove two screws ⓤ.
(2) To detach the VIDEO C.B.A., open the VIDEO C.B.A. and disconnect the CN101 and 107.
(3) Remove a screw ⓥ.
(4) To detach the RECORDER-KEY C.B.A., unplug the CN001.
(5) To detach the REMOCON C.B.A., unplug the CN612 and remove a screw ⓦ.

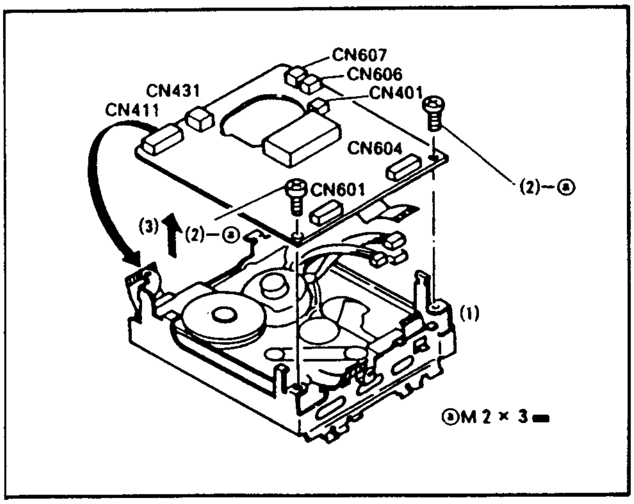


(1)-Ⓤ
CN101
(2)
CN107
(5)-Ⓦ
(4) CN001
Ⓤ DA1-1895
Ⓥ DA1-1900
Ⓦ M2×4 mm
(3)-Ⓥ

Fig. II-41

2-4-2 Removal of SYSCON-SERVO C.B.A.

(1) Unplug the CN401, 411, 431, 601, 604, 606 and 607.
(2) Remove two screws ⓐ.
(3) Detach the SYSCON-SERVO C.B.A.

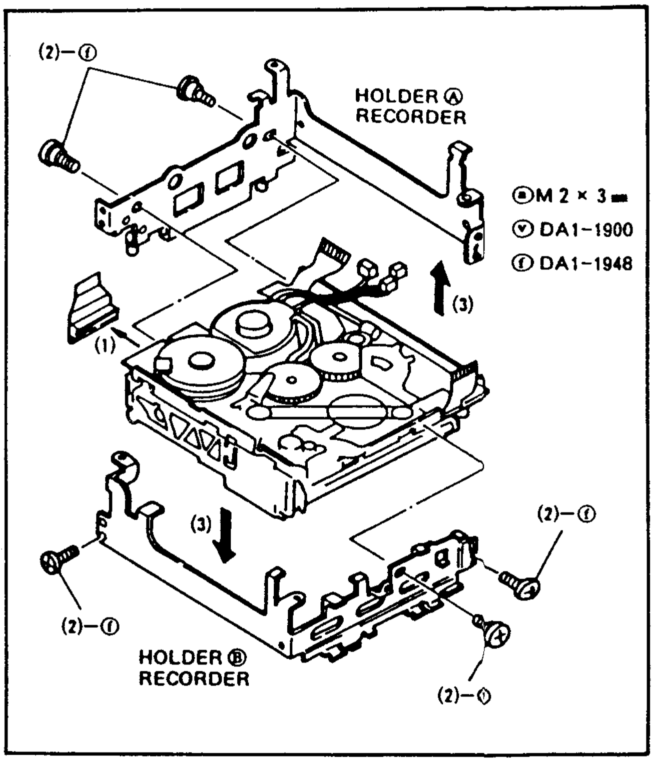


CN607
CN606
CN401
CN431
CN411
CN604
(2)-ⓐ
CN601
(3)
(2)-ⓐ
(1)
ⓐM 2 × 3 mm

Fig. II-42

2-4-3 Removal of recorder holders A and B

(1) Unplug the capstan connector.
(2) Remove two screws ⓐ, one screw ⓥ and two screws ⓕ.
(3) Detach the recorder holders A and B.



(2)-ⓕ
HOLDER Ⓐ
RECORDER
ⓐM 2 × 3 mm
ⓥ DA1-1900
ⓕ DA1-1948
(3)
(1)
(3)
(2)-ⓕ
(2)-ⓕ
HOLDER Ⓑ
RECORDER
(2)-ⓥ

Fig. II-43

2-5 Wirings

(1) SYSCON-SERVO C.B.A.

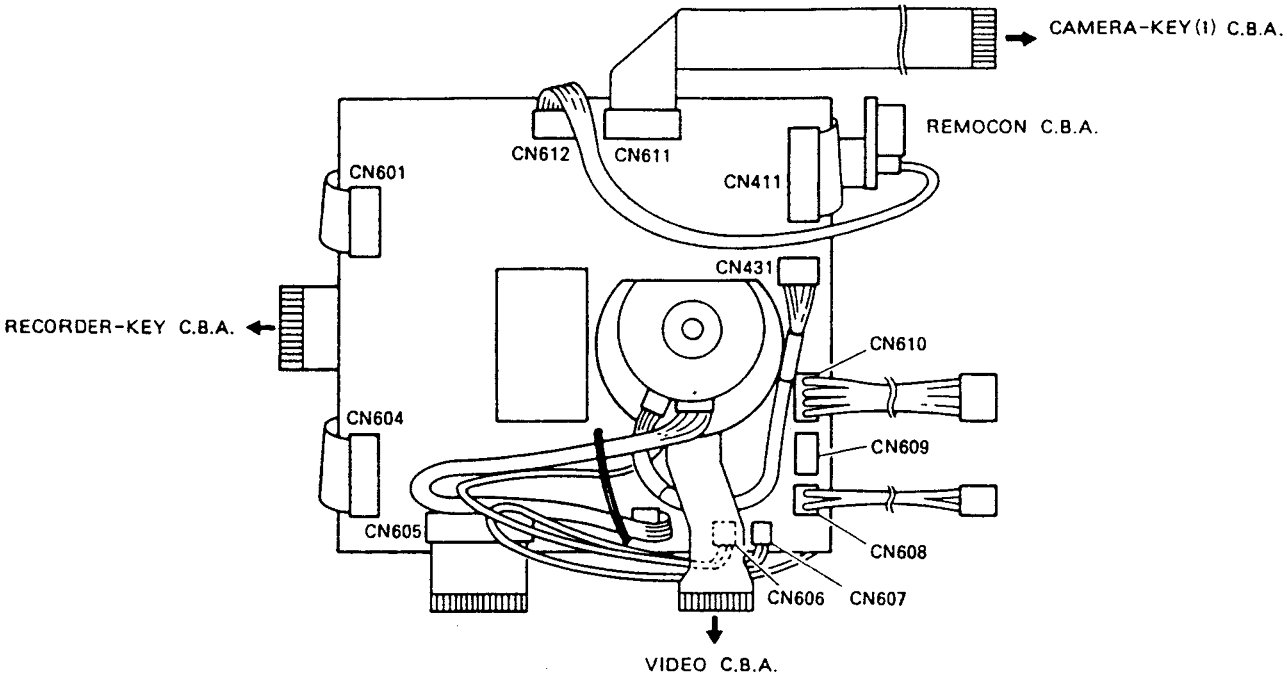

CAMERA-KEY(1) C.B.A.
REMOCON C.B.A.
CN612
CN611
CN601
CN411
CN431
RECORDER-KEY C.B.A.
CN610
CN604
CN609
CN605
CN608
CN606
CN607
VIDEO C.B.A.

Fig. II-44

(2) VIDEO C.B.A.

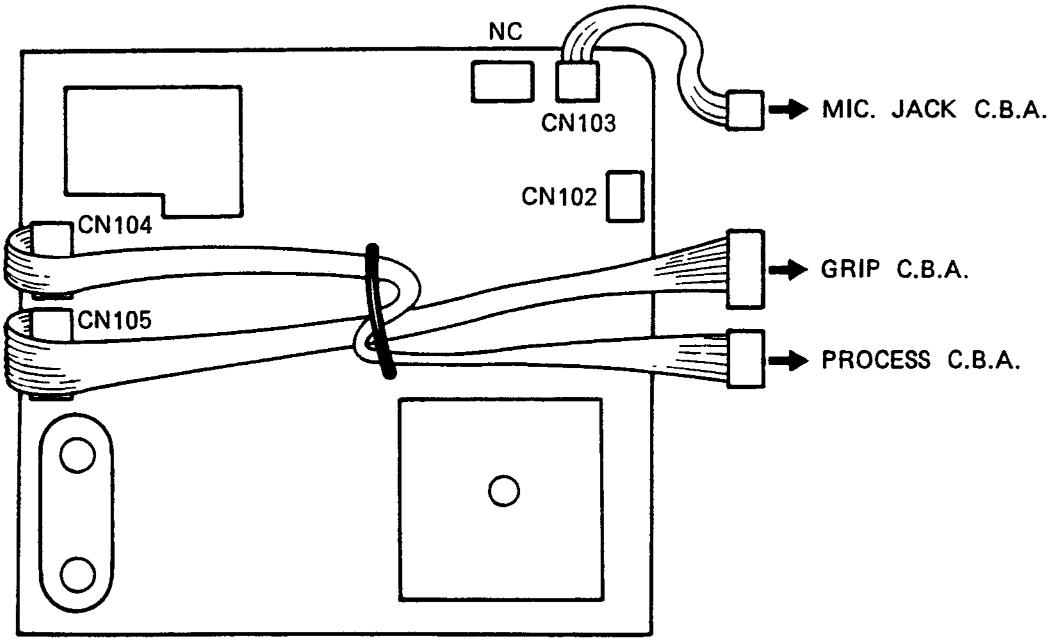
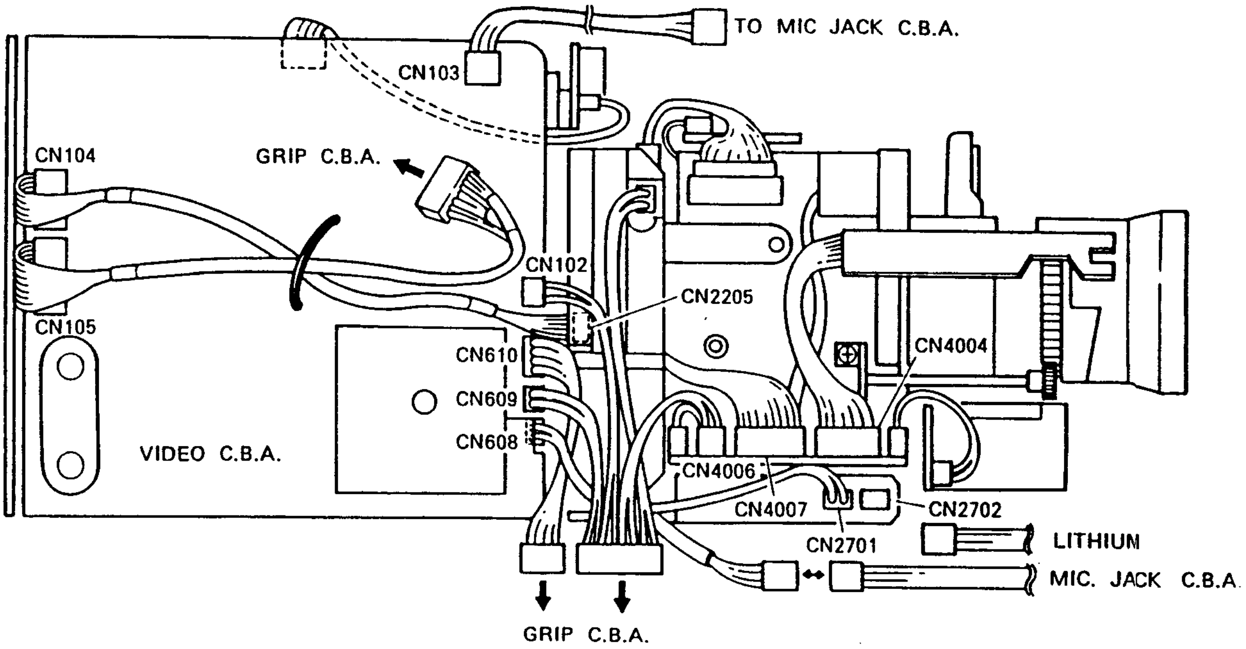

NC
CN103
MIC. JACK C.B.A.
CN102
CN104
GRIP C.B.A.
CN105
PROCESS C.B.A.

Fig. II-45

(3) Camera and recorder units


TO MIC JACK C.B.A.
CN103
CN104
GRIP C.B.A.
CN102
CN2205
CN105
CN610
CN609
CN608
VIDEO C.B.A.
CN4004
CN4006
CN4007
CN2702
CN2701
LITHIUM
MIC. JACK C.B.A.
GRIP C.B.A.

CN104-CN2205
CN105-GRIP C.B.A. CN2901
CN103-MIC. JACK C.B.A.
CN102 }
CN609 } GRIP C.B.A.
CN2001 } CN2903
CN4006 }
CN608-CN2701
CN2702-LITHIUM
CN4007-CAMERA KEY(1)C.B.A.
CN610-GRIP C.B.A. CN2904

Fig. II-46

(4) GRIP C.B.A.

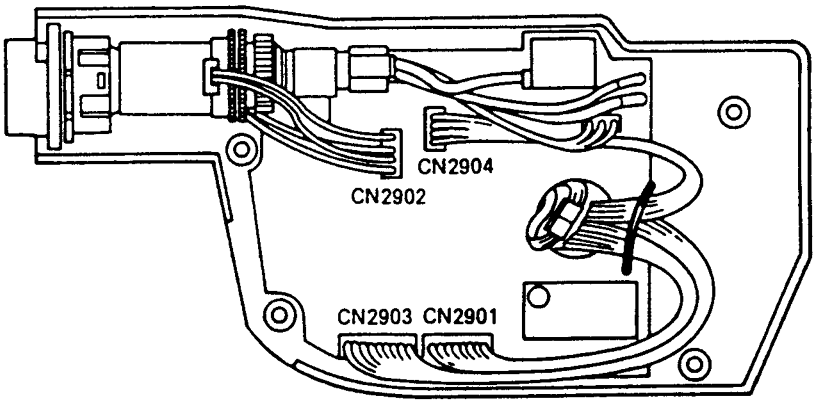

CN2904
CN2902
CN2903
CN2901

Fig. II-47

3. Adjustments (Lens Section)

3-1 Back focus adjustment (T/W zoom correction)

CHART	Siemens chart located 3 m away
M. EQ.	Monitor TV
TOOL	Phillips screwdriver
ADJ.	Focusing ring, relay lens

* Note: Open the aperture fully as possible.

(1) Loosen the screw ⓐ.

(2) With the telephoto-end zoom setting, bring the pattern image into focus by turning the focusing ring.

(3) With the wide angle end zoom setting, bring the pattern image into focus by moving the relay lens back and forth.

(4) Repeat the above steps (2) and (3) to remove defocusing at the telephoto and wide angle ends.

(5) Tighten the screw ⓐ.

* Note: When tightening, be careful not to shift the relay lens from the correct position.

(6) Check the AF distance measuring function.

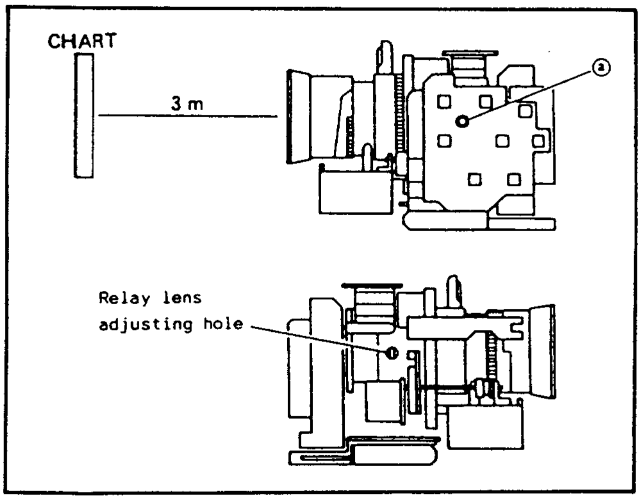


Fig. II-48

3-2 AF distance measurement adjustment

CHART	Siemens chart, 60% or higher reflectance chart
M. EQ.	Monitor TV
TOOL	Hexagonal key wrench (1.27 mm), section paper, index strip
ADJ.	AF distance adjusting screw (ⓐ)
SPEC.	+0.75 mm, -1.0 mm (+: Infinity side)

* Note: Open the aperture fully as possible.

(1) Attach the section paper and the index strip as shown in the Fig. II-49.

(2) Shoot the siemens chart from 3 m away.

(3) With the telephoto end setting, bring the chart image into best focus. Then, mark the relevant index position on the section paper.

(4) Replace the siemens chart with the 60% or higher reflectance chart.

(5) Mark the center AF stop position between the infinity and the closest ends on the section paper.

(6) Check a difference between the positions marked at the steps (3) and (5) is within the specified range.

(7) If not, adjust it by turning the hexagonal screw ⓐ.

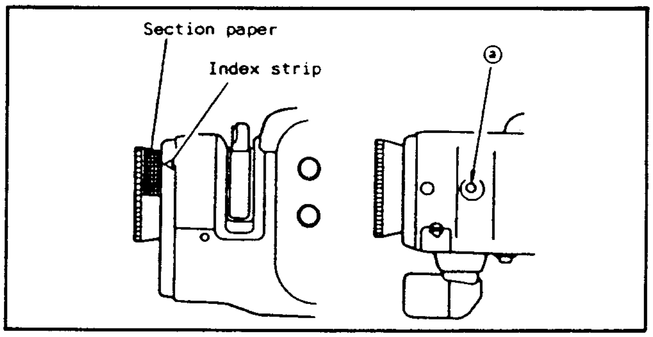


Fig. II-49

3-3 Preparation for lens focus adjustment

* Note: For this adjustment, pick up an actual scene at infinity (65 m or more away), or use a collimator.

Described below is the preparatory procedures by using the single-lens reflex camera and the lens (focal length: 300 mm or more recommended) in stead of a collimator.

CHART	Ground glass (30 mm x 40 mm, approx.)
TOOL	Single-lens reflex camera, lens (focal length: 200 mm or more), magnifier

(1) Open the aperture of single-lens reflex camera fully. Then, open the rear rid.

* Note: If the shutter equips the valve mechanism, lock it for opening the aperture. If not (e.g. Canon T series, etc.), open the aperture by using the slow shutter and take out the internal battery immediately while the shutter is opened.

(2) Secure the ground glass to the inside rail face by pressing it. At this step, the ground surface should face the lens side.

(3) Shoot a scene at infinity. To check if it is in best focus, enlarge the image on the ground glass by a magnifier.

* Note: Distance for infinity: See the Fig. II-50.

(4) After the above checking, remove the ground glass once and mark cross hair-lines on it. Then, attach it to the camera again.

* Remark: Using this substitute collimator, the back focus adjustment (T/W zoom correction) can be performed with high accuracy within a short time.

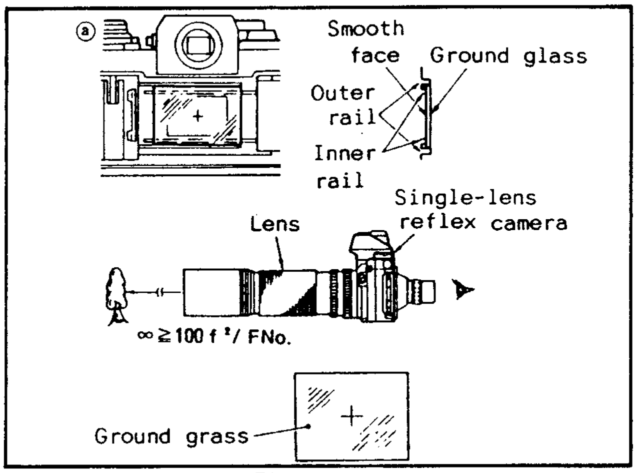

ⓐ
Smooth face
Ground glass
Outer rail
Inner rail
Single-lens reflex camera
Lens
∞≧100 f ²/ FNo.
Ground grass

Fig. II-50

3-4 Lens focus adjustment

* Note: Perform this adjustment only when the focus lens assembly is replaced.

Described below is the adjustment procedures by using the single lens reflex camera instead of a collimator.

CHART	Ground glass (30 mm x 40 mm, approx.)
M. EQ.	Monitor TV
TOOL	Single-lens reflex camera, lens (focal length: 200 mm or more), phillips screwdriver
ADJ.	Focusing lens, relay lens
SPEC.	Within 1/3 of infinity mark (∞), (±0.5 mm)

(1) Engage the concave helicoid with the focusing ring.

(2) Remove the N stopper, and take out the focus lens assembly.

* Notes: 1. When reassembling, check the screwing-in starting position.

2. Do not exert undue force at screwing-in, or the thread may be damaged.

3. When reassembling, apply grease as specified.

(3) Align the axis of main unit with that of the single-lens reflex camera as accurately as possible (visual alignment).

(4) With the telephoto end zoom setting, adjust focus using the front lens. At this time, hold the focusing ring to the infinity (∞) stop position, and turn the concave helicoid until the best focus is obtained.

(5) Loosen a screw ⓐ.

(6) Move the relay lens back and forth with the wide angle end to bring the image into best focus.

(7) Repeat the steps (4) and (6) until the object is into best focus both in wide and telephoto ends.

(8) Lock the relay lens and check that the object is in best focus.

(9) Confirm that the focusing ring is butted onto the stopper at infinity side. Then, fix the focusing ring and the concave helicoid with an instantaneous adhesives specified. (Alonalpha)

* Notes: 1. Do not apply the adhesive excessively and also be careful not to drop it onto the other positions except indicated. (esp. AF cam part Ⓓ)

2. Do not touch forcibly for five minutes after application.

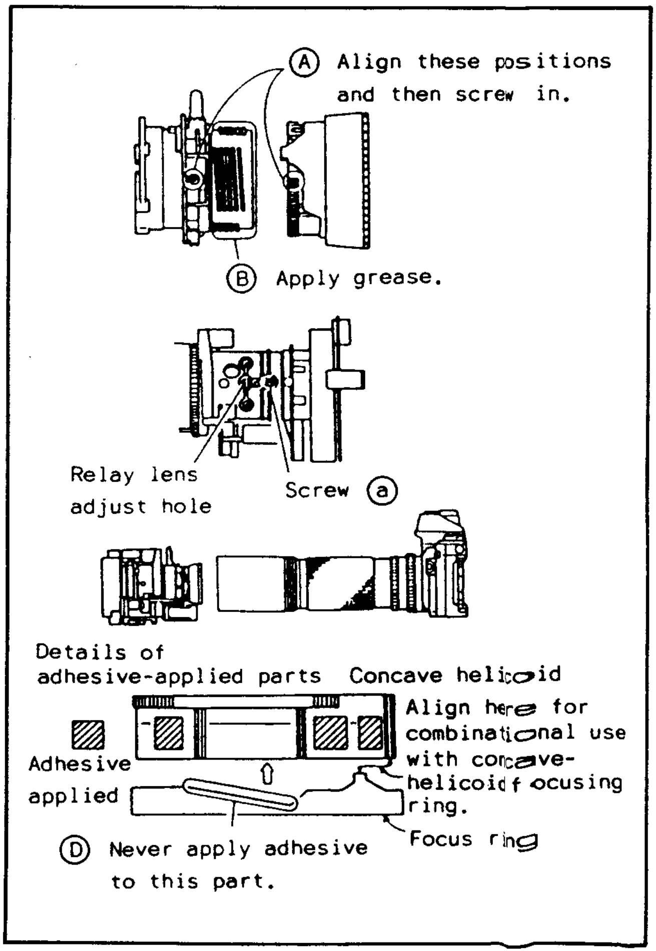

Ⓐ Align these positions and then screw in.
Ⓑ Apply grease.
Relay lens adjust hole
Screw ⓐ
Details of adhesive-applied parts
Concave helicoid
Align here for combinational use with concave-helicoid focusing ring.
Adhesive applied
Ⓓ Never apply adhesive to this part.
Focus ring

Fig. II-51

4. Electrical Adjustments (Camera Section)

* Note: For the following adjustments from 4-3 through 4-8, set the ADJUSTMENT mode.
To set the ADJUSTMENT mode, connect TP2601 (ADJ. MODE) and TP2205 (+5 V).

4-1 Clock frequency adjustment

M. EQ.	Frequency counter (connect via an oscilloscope)
TP/TRIG.	PRO. C.B.A. TP2206 (SP2)
ADJ.	SENS. C.B.A. VC2001 (CLOCK)
SPEC.	6.437500 MHz ± 30 Hz

4-2 PLL adjustment

M. EQ.	Digital voltmeter
TP/TRIG.	PRO. C.B.A. TP2208 (PLL)
ADJ.	SENS. C.B.A. VC2002 (PLL)
SPEC.	2.5 ± 0.1 V

4-3 Auto iris adjustment

* Note: After the adjustment, operate the iris with lens-capped and uncapped repeatedly to check if the specified value is obtained.

CHART	Grayscale (5600°K)
MODE	ADJ. MODE
M. EQ.	Oscilloscope
TP/TRIG.	PRO. C.B.A. TP2202 (S/H OUT) TP2203 (FH/2)
ADJ.	PRO. C.B.A. VR2201 (IRIS)
SPEC.	300 ± 10 mV

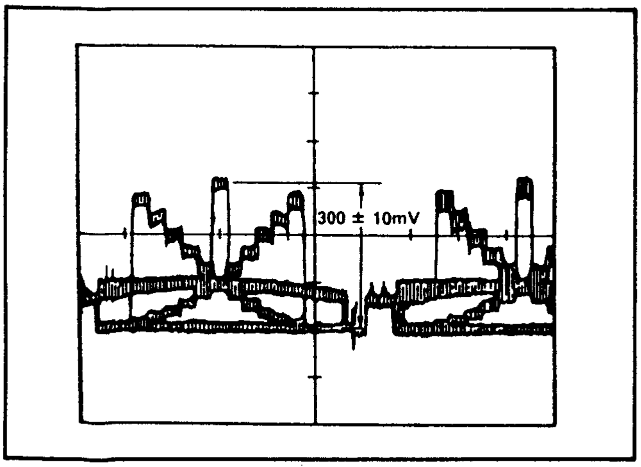


Fig. II-52 10 µs/5 mV

4-4 OB set adjustment

CHART	Lens capped
MODE	ADJ. MODE
M. EQ.	Oscilloscope
TP/TRIG.	PRO. C.B.A. TP2401 (Y_H) TP2203 (FH/2)
ADJ.	PRO. C.B.A. VR2202 (OB SET)
SPEC.	Levels of waveform and blanking centers to be the same (0 ± 10 mV)

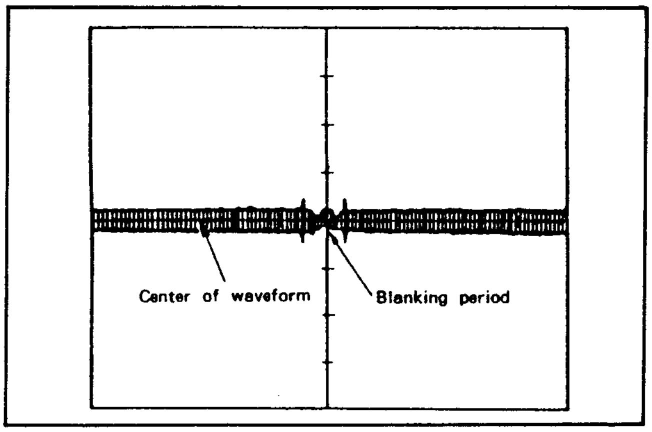


Fig. II-53 10 µs/5 mV

4-5 Y level adjustment

* Note: Before the adjustment, release the white clip.
TP2404(WHT CLIP) ◄─► TP2205(+5V)

CHART	Grayscale (5600°K)
MODE	ADJ. MODE
M. EQ.	Oscilloscope
TP/TRIG.	PRO. C.B.A. TP2400 (Y OUT) TP2203 (FH/2)
ADJ.	PRO. C.B.A. VR2203 (AGC LEVEL)
SPEC.	1120 ± 20 mV

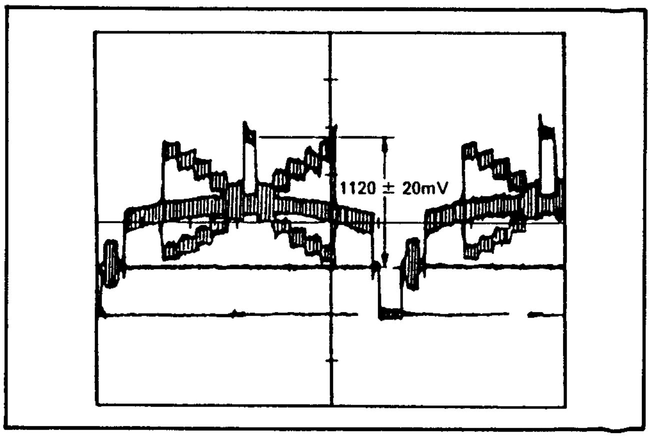


Fig. II-54 10 µs/50 mV

4-6 Color difference gain/modulation axis adjustments

CHART	Color bar (5600°K)
MODE	ADJ. MODE
M. EQ.	Vectorscope
ADJ.	PRO. C.B.A. VR2204 (C1H LEVEL) PRO. C.B.A. VR2401 (BURST ϕ) PRO. C.B.A. VC2401 (SC 90)
SPEC.	° Overlay each bright dot Acceptable dot split: Phase 5° or less Gain 10% or less ° Burst phase: 135 ± 2°

* Note: Measure dot split according to Fig. II-55.

Procedures:

(1) Align each bright dot same. (VR2204, 2401)

(2) Make the length of burst level in every 1H same. (VC2401)

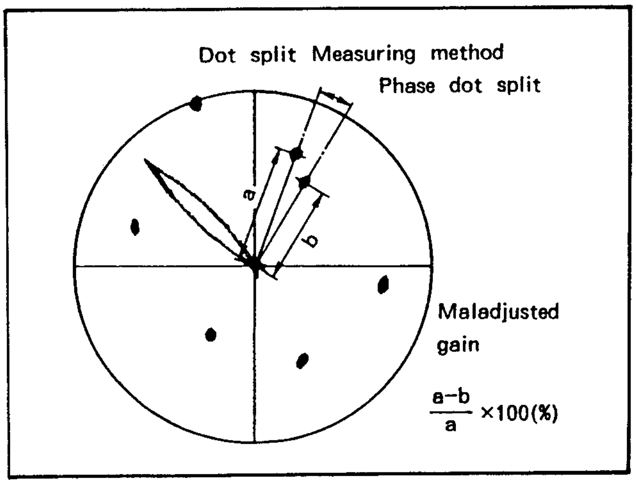

Dot split Measuring method
Phase dot split
a
b
Maladjusted gain
$\frac{a-b}{a}$ ×100(%)

Fig. II-55

4-7 Carrier balance adjustment

CHART	Grayscale (see Fig. II-56) (5600°K)
MODE	ADJ. MODE
M. EQ.	Vectorscope
ADJ.	VR2207 (B-Y CB) VR2206 (R-Y CB)
SPEC.	Bright dot (dark part)to be centered

* Notes:
1. Turn a zoom setting from the standard angle of view to a wide angle for the adjustment.
2. If two dots are appeared, choose a dot in the dark part.

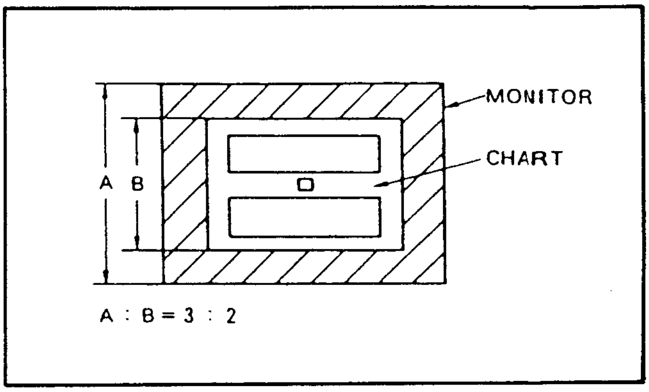

MONITOR
CHART
A
B
A : B = 3 : 2

Fig. II-56

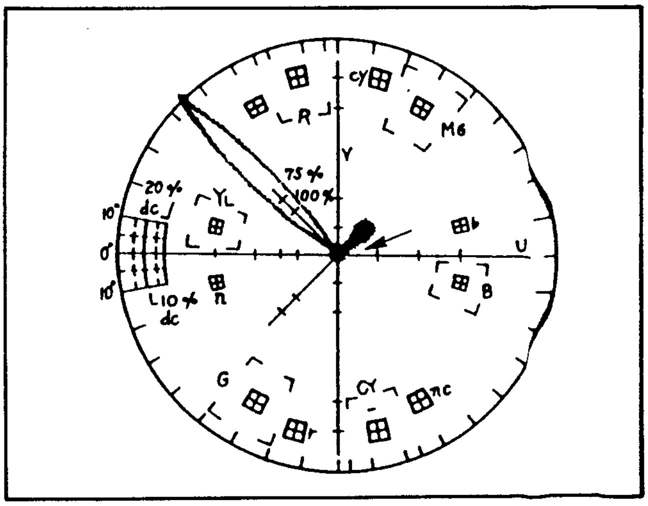

cy
R
MG
Y
75%
100%
20%
dc
YL
10°
0°
10°
10%
dc
U
B
G
CY

Fig. II-57

4-8 Chroma suppress adjustment

CHART	Color bar (5600°K)
MODE	ADJ. MODE
M. EQ.	Oscilloscope, Vectorscope
TP/TRIG.	PRO. C.B.A. TP2202 (S/H OUT), TP2203 (FH/2)
ADJ.	PRO. C.B.A. VR2205 (C SUP)
SPEC.	Adjust to a point where Ye suppression begins on vectorscope

Procedures:

(1) Shoot the color bar chart (5600°K).

(2) Observe the signal at TP2202.

(3) Set the zoom ring to wide angle of view so that Ye level becomes 330 mVp-p.

(4) Adjust VR2205 to a point just before the Ye bright dot on the vectorscope begins moving toward the center.

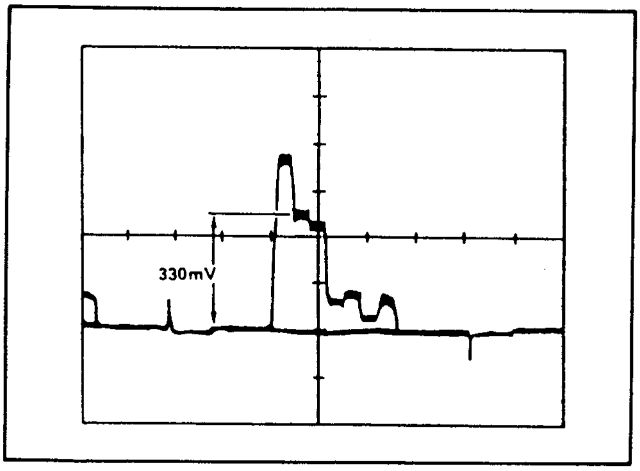


Fig. II-58

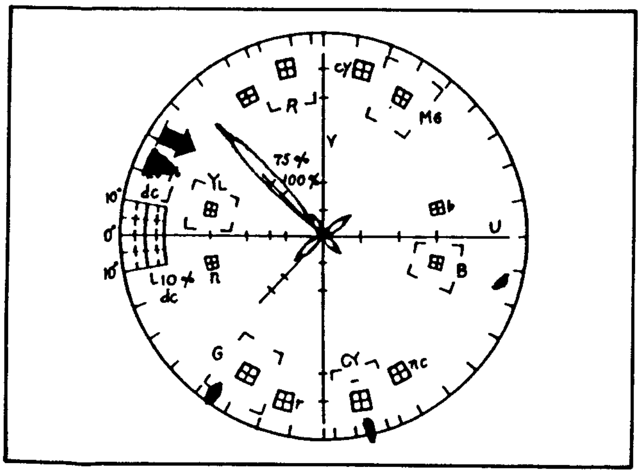


Fig. II-59

4-9 Camera microcomputer adjustment

* Notes:
1. When carrying out a single step independently, be sure to perform the step 5 after the adjustment. (See the table II-1.)
2. When "8" flashes on a liquid crystal display, something wrong occurred in the equipment. Check the wirings, etc. referring the following table. (See the table II-2.)

Table II-1

<table>
<tr><th>STEP NO.</th><th>CHART</th><th>M. EQ.</th><th>SPECIFICATION</th></tr>
<tr><td>1</td><td>Lens capped</td><td rowspan="4">Vectorscope</td><td>None (Bright dot centering unnecessary.)</td></tr>
<tr><td>2</td><td>Grayscale (5600°K)</td><td>Bright dot must be centered.</td></tr>
<tr><td>3</td><td>Color bar (5600°K)</td><td><table><tr><th></th><th>PHASE</th><th>GAIN</th></tr><tr><td>R</td><td>106°</td><td>1.5 ± 0.1</td></tr><tr><td>Ye</td><td>166° ± 5°</td><td>1.0 ± 0.1</td></tr><tr><td>G</td><td>245° ± 8°</td><td>-</td></tr></table></td></tr>
<tr><td>4</td><td>White chart (3200°K halogen lamp)</td><td>Bright dot must be centered.</td></tr>
</table>

Procedures:

(1) Connect a Camera Mi-Com. Adjuster (DY9-1095-000) with the Process C.B.A. referring to the page II-3.

(2) Perform from the step 1 through 5.

(3) Disconnect the Camera Mi-Com. Adjuster.

Table II-2

STEP NO.	ADJUSTMENT	PROCEDURE		CHECK ITEM on LED
0	———	0-0	ADJ. SW "L" state: Camera operated normally.	* Use this step for camera operation check. ("0" flahses)
1	Y_H black level set White balance (5600°K)	1-0	Set the ADJ. SW to "H".	"1" blinks
		1-1	1. Cap the lens. 2. Push the DATA SW.	"1" flashes (for 1 sec.) → lights up
2	Y_H standard level set White balance (5600°K)	2-0	Push the MODE SW.	"2" blinks
		2-1	1. Shoot the grayscale (5600°K) chart with a standard angle of view. 2. Push the DATA SW.	"2" flashes (1 sec.) → lights up
		2-2	1. Set the EVR SW. to "H" or "L". 2. Push the UP/DOWN SW to set the bright dot on the center.	"2" flashes (1 sec.) → lights up
		2-3	1. Check that the center peak of grayscale is matched on the center of screen. 2. Push the DATA SW.	"2" flashes (1 sec.) → lights up
3	Color balance (5600°K)	3-0	Push the MODE SW.	"3" blinks
		3-1	1. Shoot the color bar chart (5600°K) with a standard angle of view. 2. Push the DATA SW.	"3" lights up
		3-2	1. Set the EVR SW to "H" or "L". 2. Push the UP/DOWN SW to adjust the color balance.	"3" lights up
4	White balance (3200°K)	4-0	Push the MODE SW.	"4" blinks
		4-1	1. Shoot the white chart (3200°K, halogen lamp) with a standard angle of view. 2. By pushing the DATA SW., check that the bright dot is on the center.	"4" flashes (1 sec.)→ lights up
5	E^2PROM writing	5-0	Push the MODE SW.	"5" blinks
		5-1	Push the DATA SW.	"5" lights up

4-10 Blooming adjustment

* Notes: 1. Perform this adjustment only when the CCD is replaced. Before the PROCESS C.B.A. is replaced, measure the voltage at pin 20 of CCD (V SUB) in advance.
After mounting the new C.B.A., adjust the VR2101 to make the pin voltage same as that measured in advance.
2. If 300 mV cannot be obtained in the step (6), reduce the thickness of white paper to be attached on the rear side of U-pattern chart.

CHART	U-pattern chart (with white paper)	
MODE	Iris opened TP2201 (IRIS O/C) ◄► TP2205 (5 V)	
M. EQ.	Oscilloscope	
TOOL	ND-2.0 filter (DY9-2044-000) Halogen lamp, White paper (thin one), Fixture (supplement for A1E,F's Service Manual)	
TP/TRIG.	PRO. C.B.A. TP2202 (S/H OUT) TP2203 (FH/2)	
ADJ.	SENS. C.B.A. VR2101 (V SUB)	
SPEC.	TYPE I	Suppress blooming
	TYPE II	1100 mV

Procedures:

(1) Open the iris. (TP2201 ◄► TP2205)
(2) Attach the ND-2.0 filter on the front face of lens with the fixture. (supplement for A1E,F's Service Manual)
(3) Prepare a U-pattern chart with a white paper attached on its rear side.
(4) Make setting as shown in the Fig. II-60.
(5) Shoot the U-pattern chart with the standard angle of view.
(6) Locate the halogen lamp so that the signal level at TP2202 becomes 300 mV ("A" in the figure).
Also, adjust the angle of halogen light so that the waveform in the Fig. II-61 is obtained.
(7) Remove the ND-2.0 filter and observe the monitor TV. (Fig. II-62)
(8) Adjust VR2101 to check if the blooming is appeared.
TYPE I: If the blooming is appeared, adjust to a point where the blooming is begun to be suppressed.
TYPE II: If the blooming is not appeared, adjust the signal level at TP2201 to 1100 mV ("A" in the figure) by VR2101.

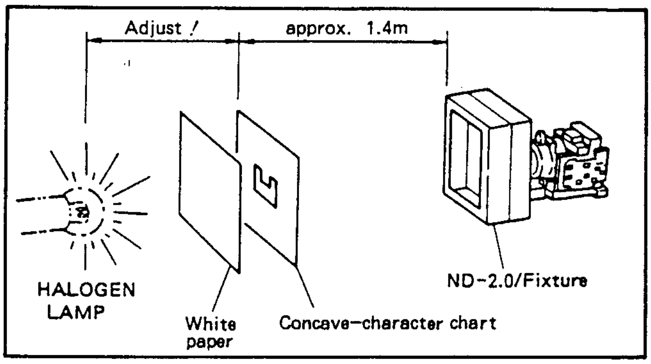


Fig. II-60

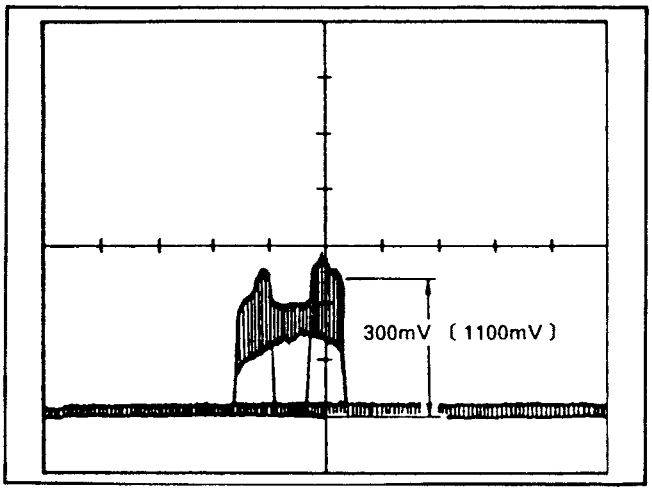


Fig. II-61 10 µs/10 mV

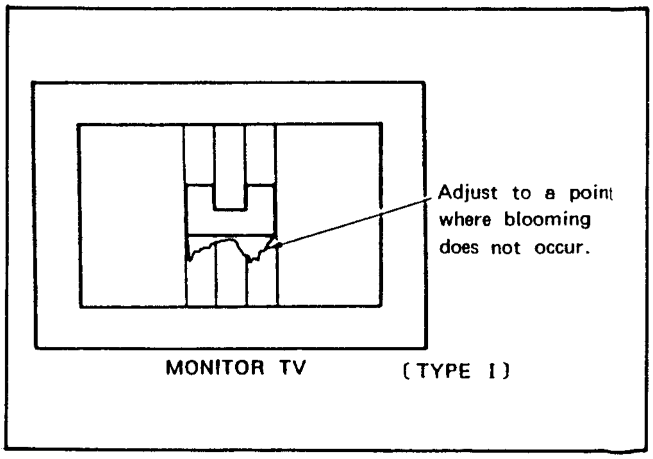


Fig. II-62

4-11 Digital memory clock adjustment

CHART	Lens capped
MODE	Digital Title Display (White)
M. EQ.	Oscilloscope or Full scan monitor
TP/TRIG.	VIDEO OUT
ADJ.	DM C.B.A. VC2701 (CLOCK)
SPEC.	Align right edges of title display and full scan monitor

Procedures:

(1) Push the title memory button several times with lens-capped until the display is turned into white.

(2) ° Use of oscilloscope

While observing the signal at VIDEO OUT, align the right edges of title display and full scan monitor.

° Use of full scan monitor

Turn VC2701 to align the right edges of title display and full scan monitor. (Fig. II-63)

* Note: If the edges cannot be aligned completely at step (2), check it on a normal monitor TV.

If the edges does not appear on it, it is acceptable.

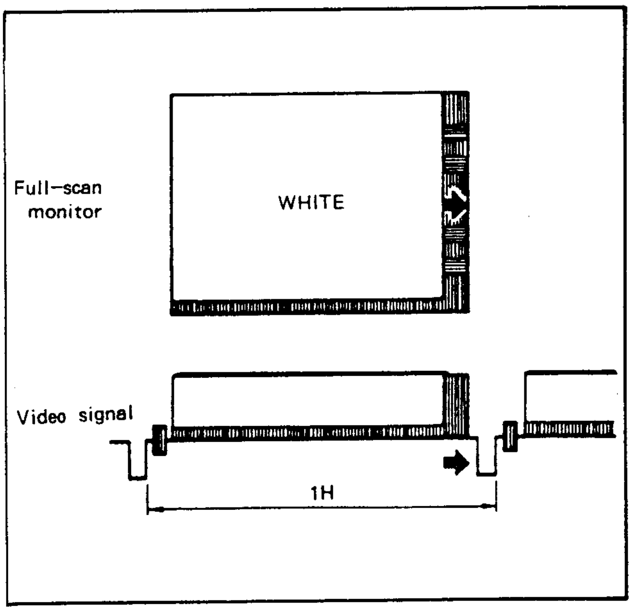


Fig. II-63

4-12 Digital memory white adjustment

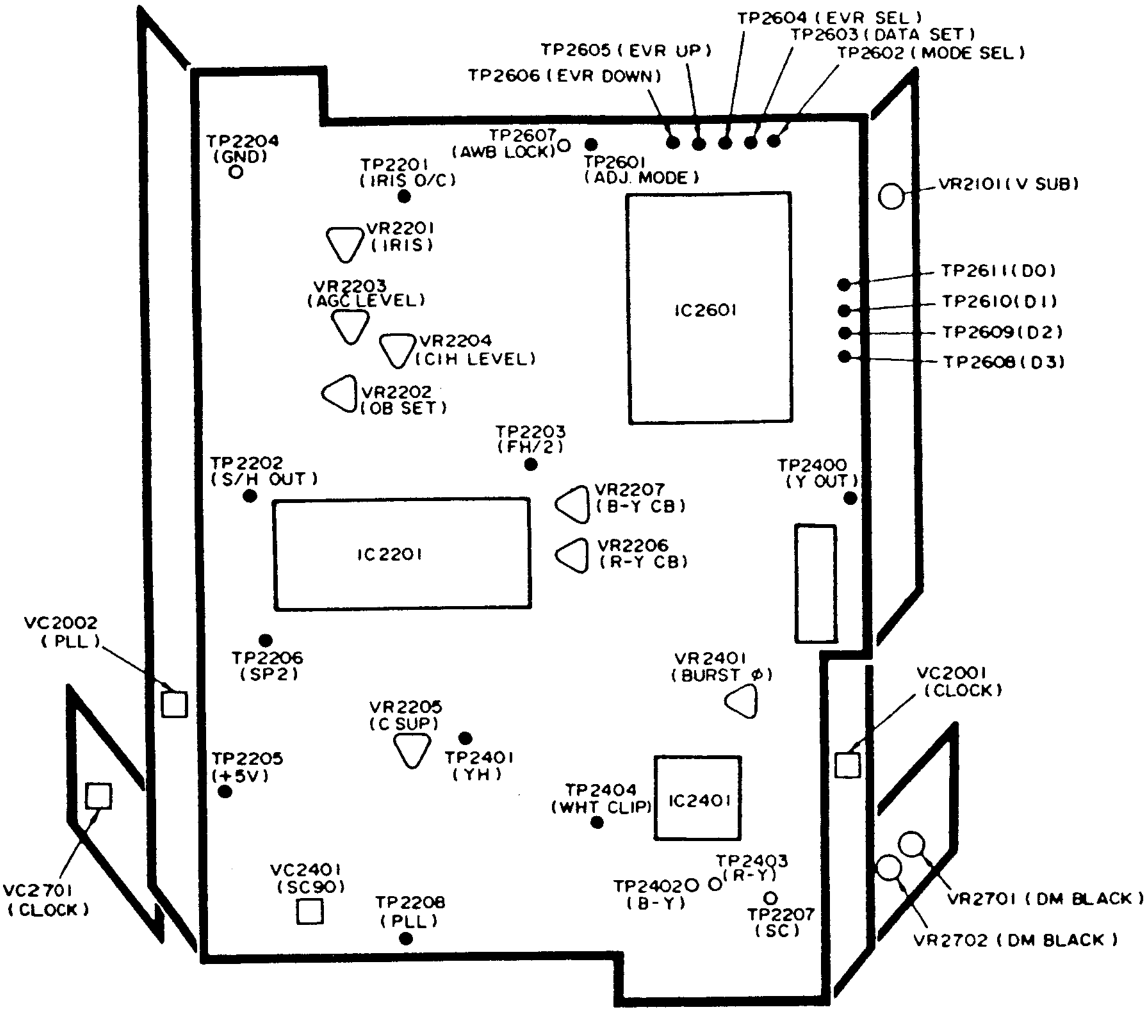
CHART	Grayscale
MODE	Digital title display (white)
M. EQ.	Vectorscope
ADJ.	DM C.B.A. VR2701, VR2702 (DM BLACK)
SPEC.	Set the bright dot (title) to the center of vectorscope

Procedures:

(1) Push the title memory button while shooting the grayscale.

(2) Set the bright dot (title) to the center of vectorscope. (VR2701, VR2702)

Locations of TP/VR/VC


TP2604 (EVR SEL)
TP2603 (DATA SET)
TP2605 (EVR UP)
TP2602 (MODE SEL)
TP2606 (EVR DOWN)
TP2204 (GND)
TP2607 (AWB LOCK)
TP2201 (IRIS O/C)
TP2601 (ADJ. MODE)
VR2101 (V SUB)
VR2201 (IRIS)
VR2203 (AGC LEVEL)
IC2601
TP2611 (D0)
TP2610 (D1)
TP2609 (D2)
TP2608 (D3)
VR2204 (CIH LEVEL)
VR2202 (OB SET)
TP2203 (FH/2)
TP2202 (S/H OUT)
TP2400 (Y OUT)
VR2207 (B-Y CB)
IC2201
VR2206 (R-Y CB)
VC2002 (PLL)
TP2206 (SP2)
VR2401 (BURST ϕ)
VC2001 (CLOCK)
VR2205 (C SUP)
TP2205 (+5V)
TP2401 (YH)
TP2404 (WHT CLIP)
IC2401
TP2403 (R-Y)
VC2401 (SC90)
TP2402 (B-Y)
VC2701 (CLOCK)
TP2208 (PLL)
TP2207 (SC)
VR2701 (DM BLACK)
VR2702 (DM BLACK)

< PROCESS CBA >

TP2201	IRIS O/C
2202	S/H OUT
2203	FH/2
2204	GND
2205	+5V
2206	SP2
2207	SC
2208	PLL
2400	Y OUT
2401	YH
2402	B-Y
2403	R-Y
2404	WHT CLIP
TP2601	ADJ. MOD
2602	MODE SEL
2603	DATA SET
2604	EVR SEL
2605	EVR UP
2606	EVR DOWN
2607	AWB LOCK
2608	D3
2609	D2
2610	D1
2611	D0
VR2201	IRIS
2202	OB SET
VR2203	AGC LEVEL
2204	CIH LEVEL
2205	C SUP
2206	R-Y CB
2207	B-Y CB
2401	BURST ϕ
VC2401	SC90

< SENSOR CBA >

VR2101	V SUB
VC2001	CLOCK
2002	PLL

< DM CBA >

VR2701	DM BLACK
2702	DM BLACK
VC2701	CLOCK

5. Electrical Adjustments

* Notes:
1. Set the switch of Y/C separator to the Y side for the following all adjustemnts.
2. Unless otherwise specified, set the SP mode.

5-1 SS5V adjustment

* Note: Open the VIDEO C.B.A. for this adjustment

MODE	EE
M. EQ.	Digital voltmeter
TP/TRIG.	SS C.B.A. TP603 (SS 5V)
ADJ.	SS C.B.A. VR601 (SS 5V)
SPEC.	5.1 + 0.05 V

5-2 Undercut adjustment

MODE	REC
M. EQ.	Digital voltmeter, Monitor TV.
ADJ.	GRIP C.B.A. VR2961 (BATT)
SPEC.	BATT = 80 ± 01H/5.65 ± 0.1V

Procedures:

(1) Set a power sopurce voltage at 5.65 ± 0.1 V.

(2) Set the SERVICE MODE [SERVICE 01] with a wireless remote controller.

(3) Turn VR until the specification is obtained.

5-3 ATF bias adjustment

SIGNAL	Color bar
MODE	REC PAUSE
M. EQ.	Monitor TV
ADJ.	SS C.B.A. VR401 (ATF)
SPEC.	ATF = 80 ± 03 H

Proceudres:

(1) Short-circuit TP401 (16K) and TP402 (47K) of SS C.B.A. by using a capacitor. (Use a capacitor approx. 10 µF/10 V.)

(2) Set the SERVICE MODE [SERVICE 01] with a wireless remote controller.

(3) Turn VR until the specification is obtained.

5-4 Switching point adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	SS C.B.A. TP410 (HSW), VIDEO OUT
ADJ.	SS C.B.A. VR603 (PG)
SPEC.	7.0 ± 1 H

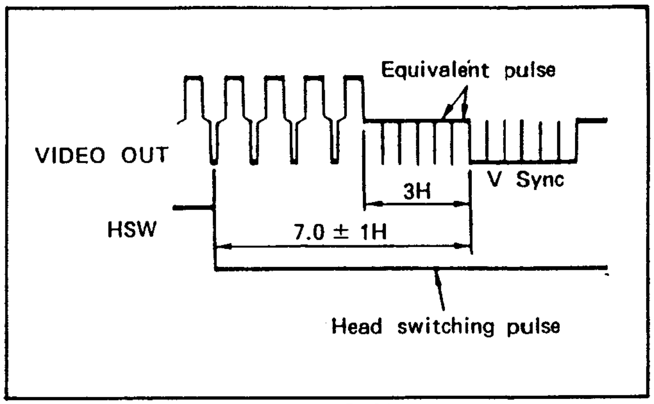


Fig. II-64

5-5 AV5V adjustment

MODE	STOP
M. EQ.	Digital voltmeter
TP/TRIG.	VIDEO C.B.A. TP102 (AV5V)
ADJ.	VIDEO C.B.A. VR101 (AV5V)
SPEC.	5.1 ± 0.05 V

5-6 VIDEO AGC adjustment

SIGNAL	100% white video signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP109 (Y AGC)
ADJ.	AGC C.B.A. VR382 (Y AGC)
SPEC.	0.5 ± 0.05 V

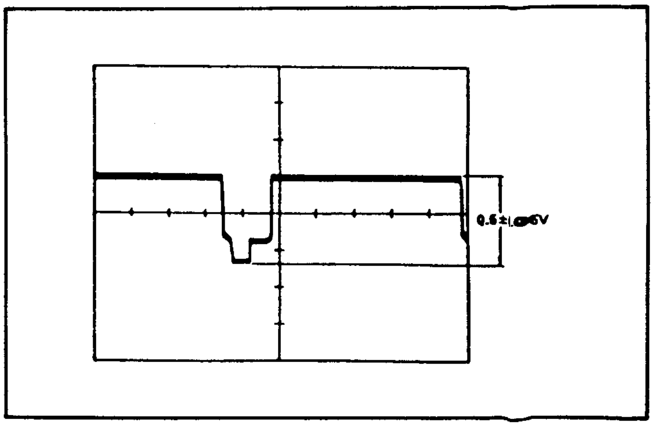


Fig. II-65 20 mV/10 µs

5-7 Video level adjustment

SIGNAL	100% white video signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP110 (Y)
ADJ.	VIDEO C.B.A. VR112 (V LEVEL)
SPEC.	0.5 ± 0.05 V

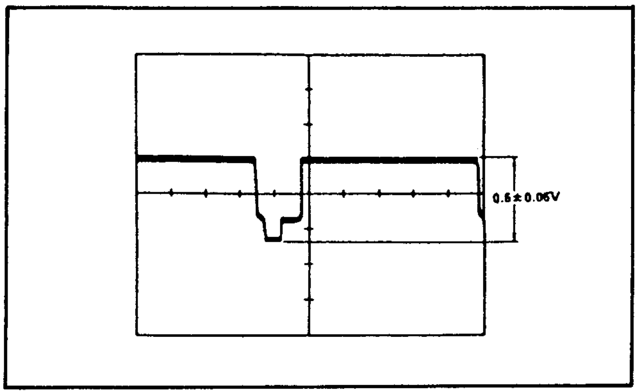


Fig. II-66 20 mV/10 μs

5-8 YC separation adjustment

SIGNAL	Color bar
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP107 (EMPHASIS)
ADJ.	VIDEO C.B.A. VR107 (Y/C SEP)
SPEC.	Minimize chrominance component as possible.

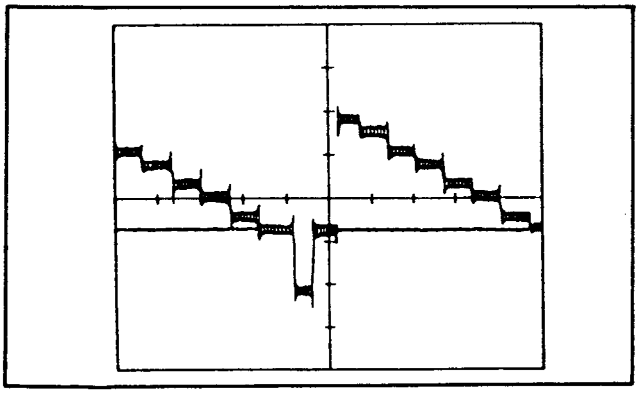


Fig. II-67 5 mV/10 μs

5-9 Y FM carrier adjustment

SIGNAL	No signal (terminal-opened)
MODE	EE
M. EQ.	Oscilloscope, frequency counter
TP/TRIG.	VIDEO C.B.A. TP106 (Y FM)
ADJ.	VIDEO C.B.A. VR109 (Y CAR)
SPEC.	4.38 ± 0.04 MHz

5-10 Y FM deviation adjustment

SIGNAL	100% white video signal
MODE	EE
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP106 (Y FM)
ADJ.	VIDEO C.B.A. VR108 (Y DEV)
SPEC.	Graduation 3.8 at 50 ns Div. (0.19 μs/1 cycle)

* Note: Use the signal waveform having the shortest cycle.

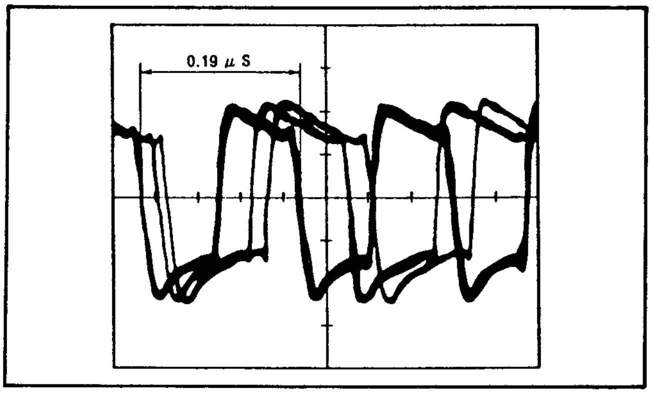


Fig. II-68 10 mV/50 μs

5-11 FM audio carrier adjustment

SIGNAL	No signal (Terminal-opened)
MODE	EE
M. EQ.	Oscilloscope, Frequency counter
TP/TRIG.	VIDEO C.B.A. TP103 (A FM)
ADJ.	VIDEO C.B.A. VR104 (A CAR)
SPEC.	1.5 ± 0.02 MHz

5-12 FM audio deviation adjustment

SIGNAL	DO adj. master (DY9-1064-000)
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. PIN JACK (AUDIO I/O)
ADJ.	VIDEO C.B.A. VR103 (A DEV)
SPEC.	890 ± 50 mV

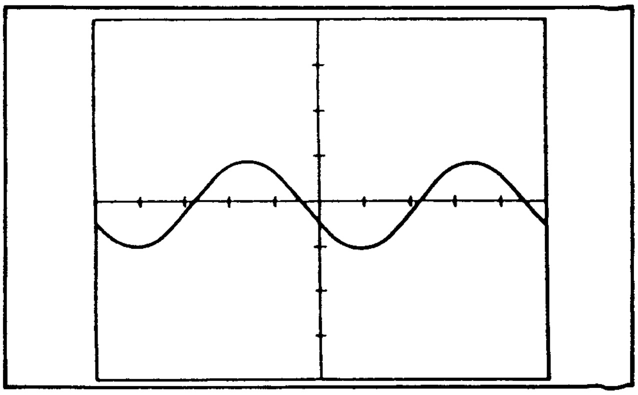


Fig. II-69 50 mV/5 ns

5-13 Recording current adjustment

(1) Luminance signal

SIGNAL	No signal (terminal-opened)
MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP101 (REC CURR)
ADJ.	VIDEO C.B.A. VR106 (REC Y)
SPEC.	300 ± 10 mV

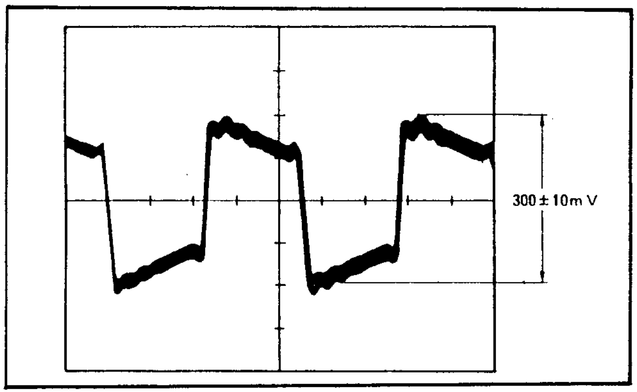


Fig. II-70 10 mV/50 ns

(2) Chrominance/Audio/ATF signals

* Note: To connect TP101 with a recording current checker, use a probe (1:1).

MODE	REC
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP101 (REC CURR)
TOOL	Recording current checker (DY9-1056-000)

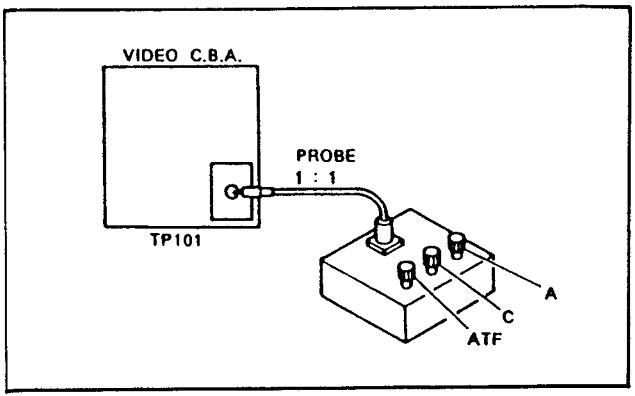


Fig. II-71

Chrominance

SIGNAL	Color bar signal
ADJ.	VIDEO C.B.A. VR102 (REC C)
SPEC.	2.9 ± 0.1 Vp-p

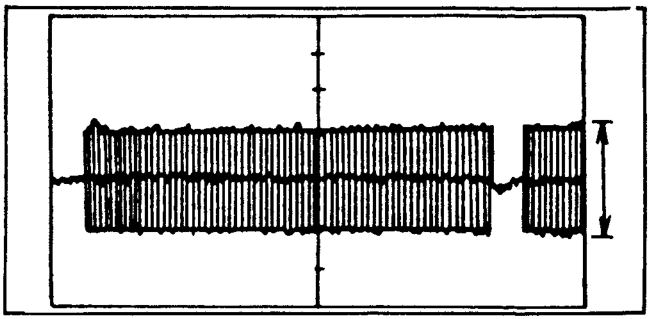


Fig. II-72 50 mV/2 ms

Audio

SIGNAL	No signal (Terminal-opened)
ADJ.	VIDEO C.B.A. VR105 (REC AFM)
SPEC.	1.5 V ± 0.1 Vp-p

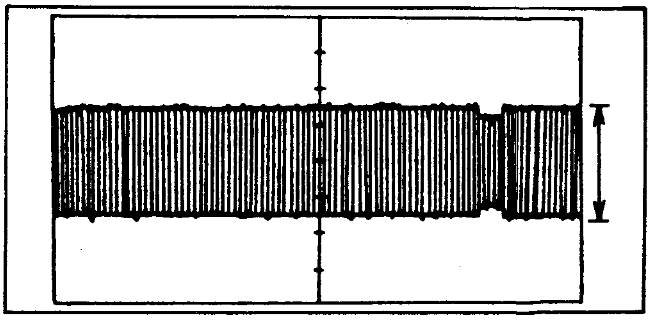


Fig. II-73 50 mV/2 ms

ATF

SIGNAL	100% white video signal
ADJ.	VIDEO C.B.A. VR111 (REC 4f)
SPEC.	DC 1.2 ± 0.1 V

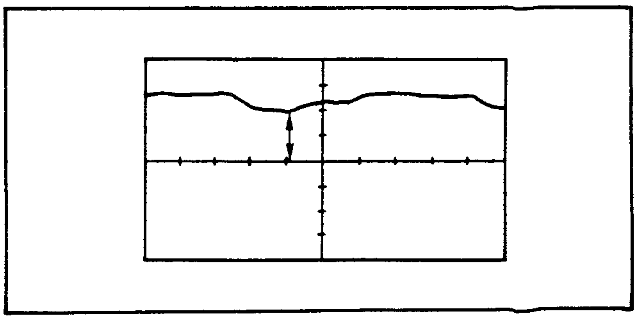


Fig. II-74 5 mV/10 ns

5-14 Playback Y level adjustment

SIGNAL	Self-recorded white 100% singal
MODE	PB
M. EQ.	Oscilloscope
TP/TRIG.	VIDEO C.B.A. TP109 (Y AGC)
ADJ.	AGC C.B.A. VR381 (PB Y)
SPEC.	0.5 ± 0.02 V

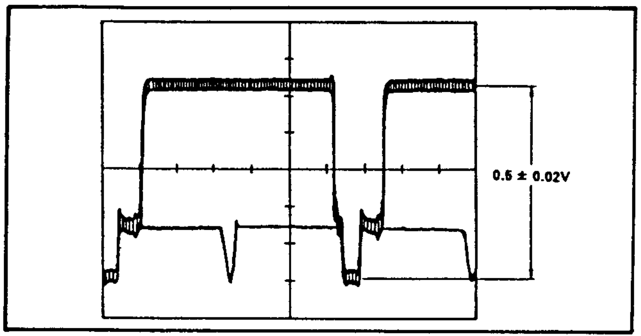


Fig. II-75

10 mV/10 µs

5-15 JOG Chrominance phase adjustment

SIGNAL	Self-recorded color bar
MODE	SEARCH
M. EQ.	Monitor TV
ADJ.	VIDEO C.B.A. VR113 (JOG BURST)
SPEC.	Reduce black noise bars appearing under each white noise bars as possible.

5-16 Character position of character generator adjustment

SIGNAL	Color bar
MODE	EE
M. EQ.	Monitor TV
TP/TRIG.	GRIP C.B.A. VC2941 (CG SIZE)
SPEC.	Lowermost digit of counter located between blue and black color bars

* Note: Make characters display with a wireless remote controller.

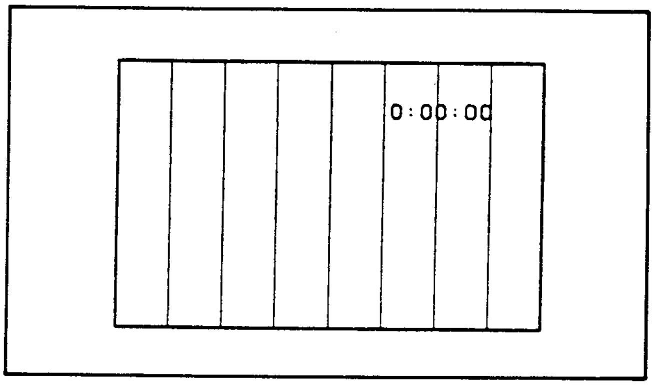
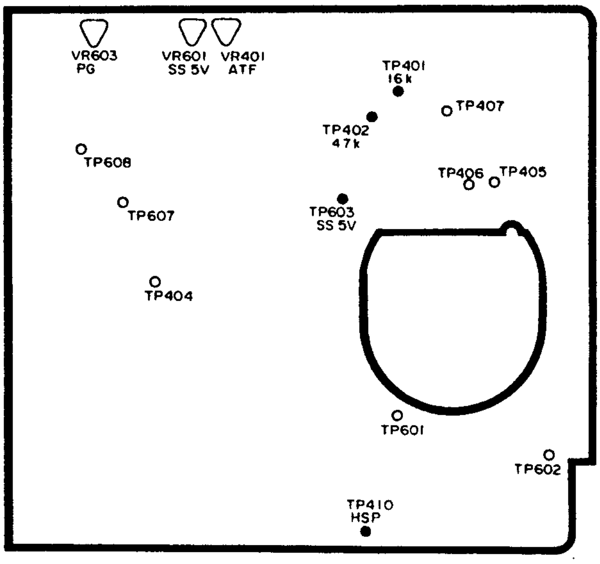


Fig. II-76

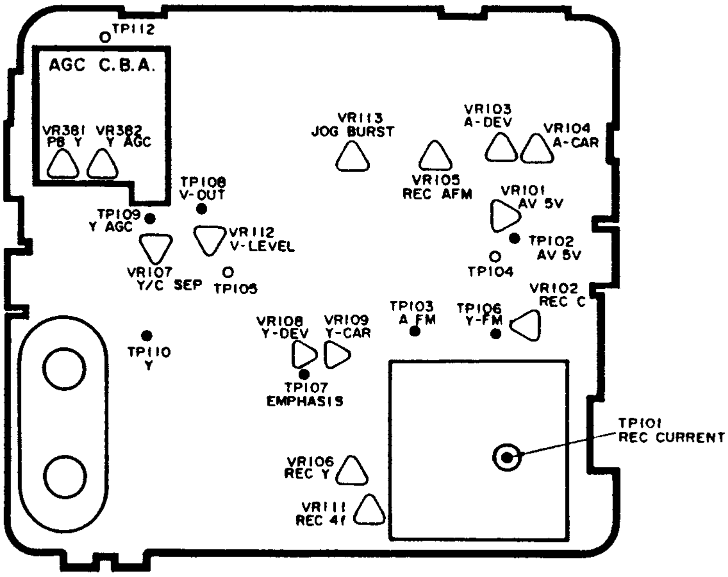
Locations of TP/VR/VC

SYSCON-SERVO C.B.A.


VR603
PG
VR601
SS 5V
VR401
ATF
TP401
16k
TP407
TP402
47k
TP608
TP406
TP405
TP603
SS 5V
TP607
TP404
TP601
TP602
TP410
HSP

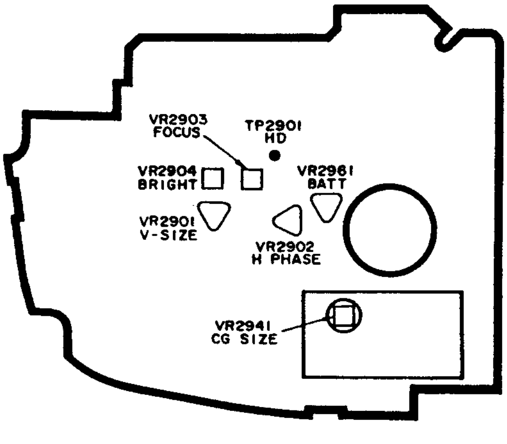
TP	401	16K
	402	47K
	410	HSP
	603	SS5V
VR	401	ATF
	601	SS5V
	603	PG

VIDEO C.B.A.


TP112
AGC C.B.A.
VR381
PB Y
VR382
Y AGC
VR113
JOG BURST
VR103
A-DEV
VR104
A-CAR
VR105
REC AFM
VR101
AV 5V
TP108
V-OUT
TP109
Y AGC
VR112
V-LEVEL
TP102
AV 5V
VR107
Y/C SEP
TP105
TP104
VR102
REC C
TP103
A FM
TP106
Y-FM
VR108
Y-DEV
VR109
Y-CAR
TP110
Y
TP107
EMPHASIS
TP101
REC CURRENT
VR106
REC Y
VR111
REC 4f

TP	101	REC CURRENT
	102	AV5V
	103	A FM
	106	Y-FM
	107	EMPHASIS
	108	V-OUT
	109	Y AGC
	110	Y
VR	101	AV5V
	102	REC C
	103	A-DEV
	104	A-CAR
	105	REC-AFM
	106	REC Y
	107	Y/C SEP
	108	Y-DEV
	109	Y-CAR
	111	REC 4f
	112	V-LEVEL
	113	JOG BURST
	381	PB Y
	382	Y AGC

GRIP C.B.A.


VR2903
FOCUS
TP2901
HD
VR2904
BRIGHT
VR2961
BATT
VR2901
V-SIZE
VR2902
H PHASE
VR2941
CG SIZE

TP	2901	HD
VR	2901	V-SIZE
	2902	H PHASE
	2903	FOCUS
	2904	BRIGHT
	2961	BATT
VC	2941	CG SIZE

6. EVF Adjustments

6-1 Free-run frequency adjustment

SIGNAL	No signal (Terminal-opened)
MODE	LINE IN
M. EQ.	Oscilloscope, frequency counter
TP/TRIG.	GRIP C.B.A. TP2901 (HD)
ADJ.	GRIP C.B.A. VR2902 (H. PHASE)
SPEC.	15.90 ± 0.05 KHz

6-2 Vertical amplitude adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF, Monitor TV
ADJ.	GRIP C.B.A. VR2901 (V-SIZE)
SPEC.	Circle on monoscope master free from distortion. Absence of incongruity in comparison with monitor TV screen

6-3 Rotation and centering adjustment

SIGNAL	Monoscope master (DY9-1062-000)
MODE	PLAY
M. EQ.	EVF
ADJ.	Deflection yoke, centering magnet
SPEC.	Screen is not tilted and is located right at the center.

Procedures:

(1) Loosen the fastening ring to enable the deflection yoke to be moved.

(2) Turn the deflection yoke to correct screen tilt.

* Note: Move the deflection yoke completely toward the CRT screen.

(3) Tighten the fastening ring.

* Note: The fastening ring must be tightened so that the centering magnet can still be moved.

(4) Adjust the centering magnet so as to locate the picture at the center.

(5) Tighten the fastening ring completely.

* Note: Pay attention not to overtighten the ring.

(6) Fix the centering magnet by applying paint or the like (in 180° direction, at 2 points.).

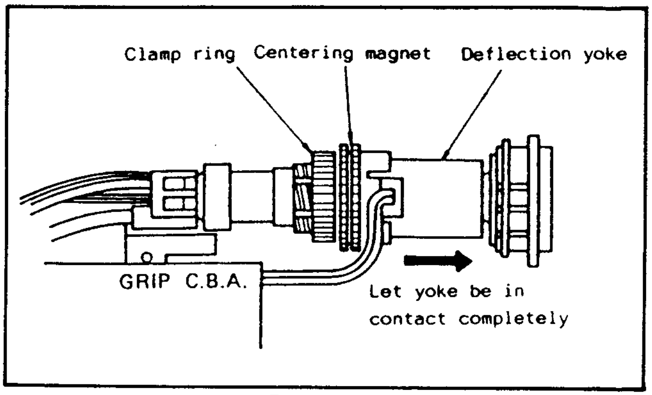

Clamp ring
Centering magnet
Deflection yoke
GRIP C.B.A.
Let yoke be in contact completely

Fig. II-78

6-4 Brightness adjustment

SIGNAL	Self-record/playback tape (grayscale)
MODE	PLAY
M. EQ.	EVF
ADJ.	GRIP C.B.A. VR2904 (BRIGHT)
SPEC.	Distinguishable down to 11th step grayscale

6-5 Focus adjustment

MODE	Lens-capped (character display)
M. EQ.	EVF
ADJ.	GRIP C.B.A. VR2903 (FOCUS)
SPEC.	EVF character under optimum focus

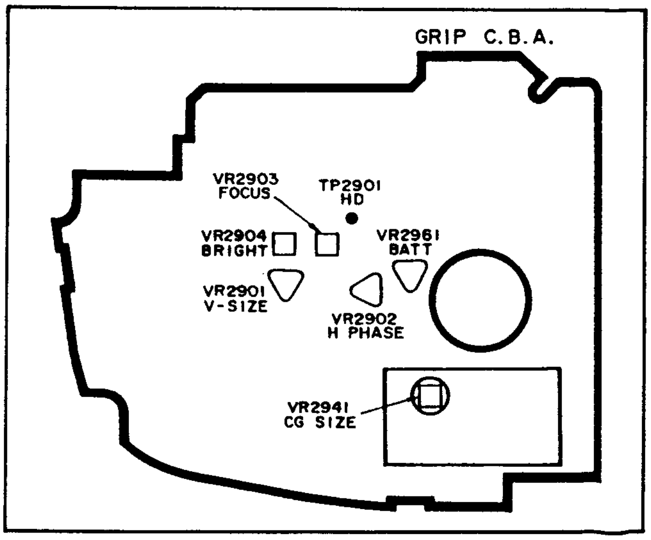

GRIP C.B.A.
VR2903 FOCUS
TP2901 HD
VR2904 BRIGHT
VR2961 BATT
VR2901 V-SIZE
VR2902 H PHASE
VR2941 CG SIZE

Fig. II-79

7. Mechanical Adjustment of Recorder Section

For mechanical adjustment of the recorder section, refer to the MC-4B service manual. The additional mechanical adjustment items only applied for E640E,F are explained here.

① Service mode (220° 70%)
(See Fig. II-80.)

Service mode (220° 70%) is set for tracking fine adjustment (4-3). However, sometimes the waveform does not match 70% RF envelope output. In such cases, turn the VR401 (on SS C.B.A.) until the waveform is adjusted to 70%.

* Note: After tracking fine adjustment, readjust the ATF bias (5-3) and return the VR401 to the original position.

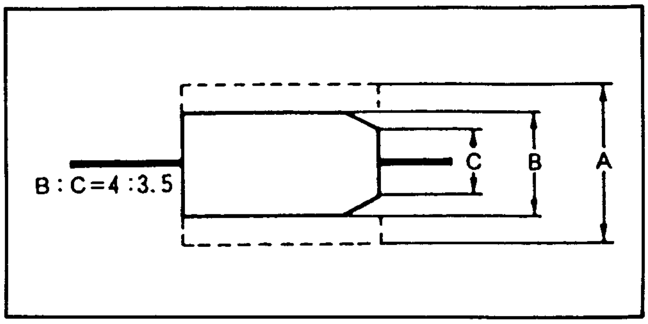


Fig. II-80

② Tape transport adjustment

Perform the tape transport adjustment referring to the setting 1-3-1 3) on page II-7.

CONTENTS

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Mechanical Chassis Section 2 ……… Ⅲ－9

Mechanical Chassis Section 3 ……… Ⅲ－11

Accessory Parts Section ……… Ⅲ－13

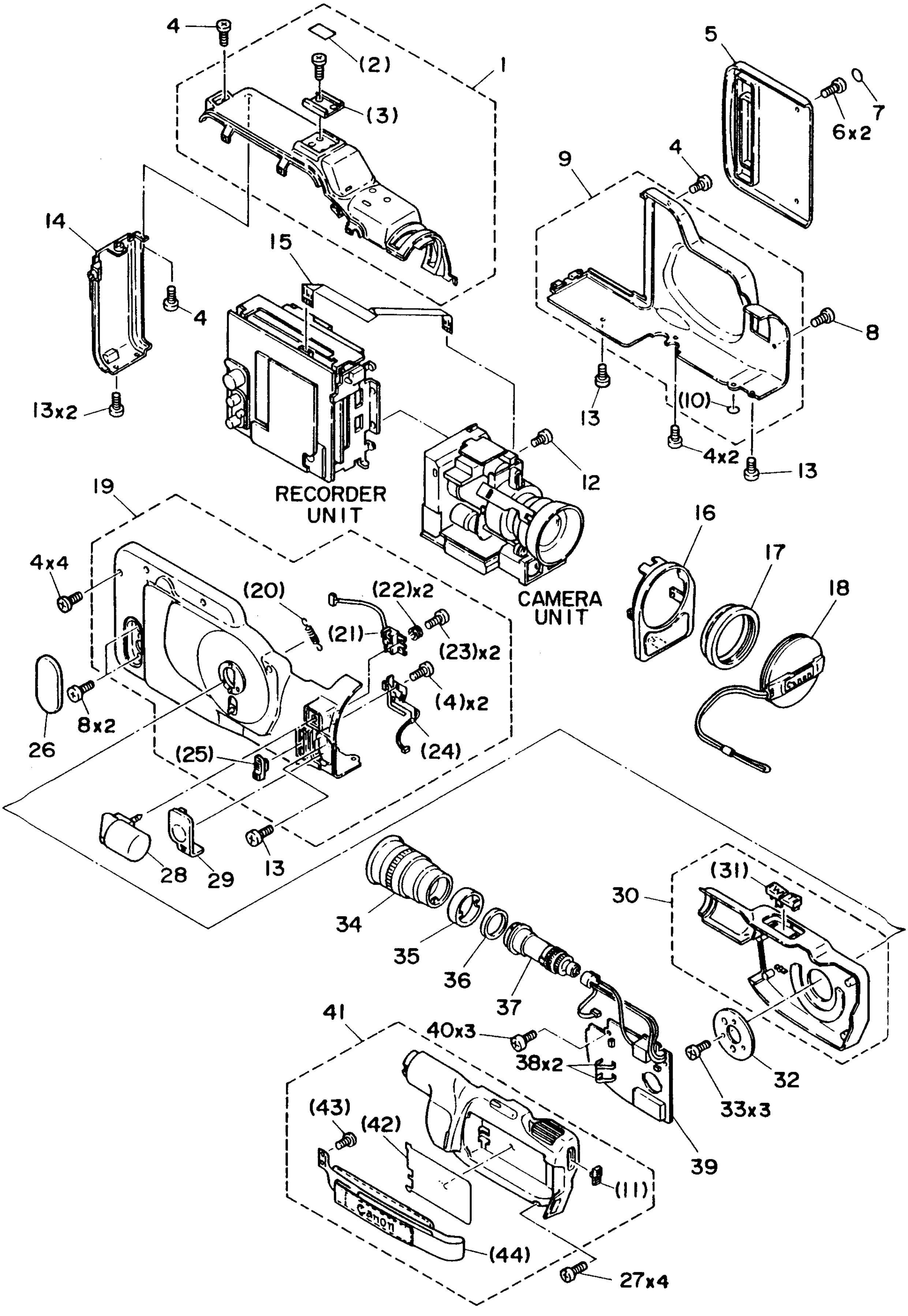
ELECTRICAL PARTS LIST ……… Ⅲ－15

PARTS LIST ……… Ⅲ－20

1. ESPECIALLY CRITICAL PARTS IN THE POWER CIRCUIT BLOCK SHOULD NOT BE REPLACED WITH OTHER MARKS.
   CRITICAL PARTS ARE MARKED WITH ⚠ IN THIS ELECTRICAL PARTS LIST.

2. THE NUMBERS INDICATED ON THE CONNECTORS DO NOT CORRESPOND TO THE SYMBOL NUMBERS.
   PLEASE CHECK THE CORRECT SYMBOL NUMBERS OF THE CONNECTORS ON THE INTERCONNECTION SCHEMATIC DIAGRAM.

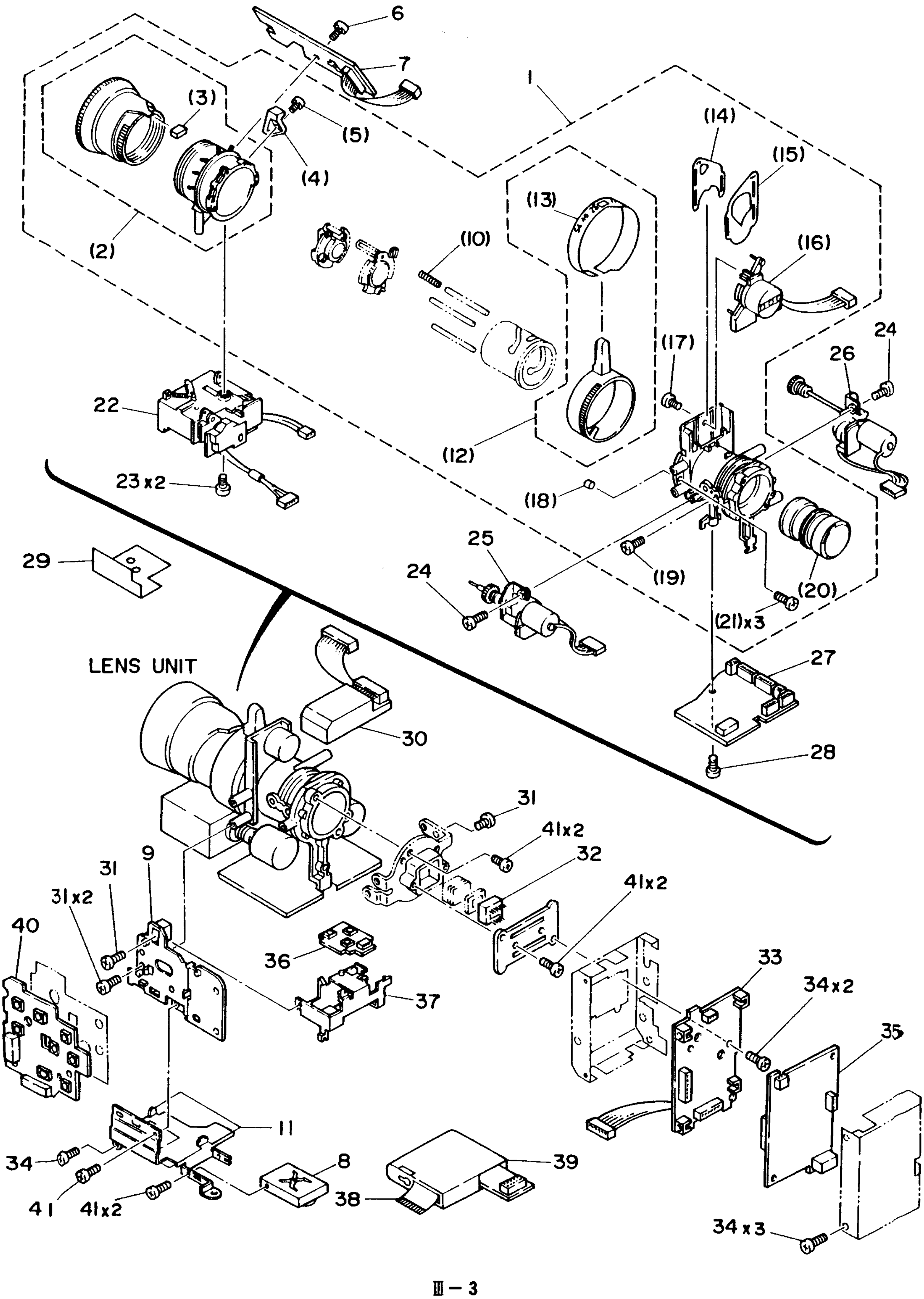
Casing Parts Section


4
(2)
1
(3)
5
7
6x2
9
4
14
15
4
13x2
8
13
(10)
4x2
13
12
RECORDER UNIT
CAMERA UNIT
19
16
17
18
4x4
(20)
(22)x2
(21)
(23)x2
(4)x2
26
8x2
(25)
(24)
28
29
13
34
35
36
37
(31)
30
32
33x3
41
40x3
38x2
39
(43)
(42)
(11)
(44)
27x4

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY2-1188-000 000	B	1	TOP COVER ASS'Y	E640E ONLY
	DY2-1189-000 000	B	1	TOP COVER ASS'Y	E640F ONLY
2	DA1-2489-000 000	B	1	SHEET, ACCESSORY SHOE	
3	DA1-2486-000 000	B	1	SHOE, ACCESSORY	
4	XA9-0449-000 000	F	11	SCREW, CROSS-RECESS, PH	
5	DF1-0546-000 000	B	1	COVER, CASSETTE	E640E ONLY
	DF1-0547-000 000	B	1	COVER, CASSETTE	E640F ONLY
6	XA1-7200-307 000	F	2	SCREW, CROSS-RECESS, PH	
7	DA1-2386-000 000	B	2	SEAL	
8	XA1-7200-509 000	F	3	SCREW, CROSS-RECESS, PH	
9	DG1-0937-000 000	B	1	RIGHT COVER ASS'Y	E640E ONLY
	DG1-0931-000 000	B	1	RIGHT COVER ASS'Y	E640F ONLY
10	DA1-1940-000 000	B	1	SEAL, PC	
11	DA1-1857-000 000	B	1	KNOB, BATTERY EJECT	
12	DA1-1948-000 000	C	1	SCREW	
13	XA1-7200-409 000	F	5	SCREW, CROSS-RECESS, PH	
14	DY2-1190-000 000	B	1	COVER, REAR	E640E ONLY
	DY2-1191-000 000	B	1	COVER, REAR	E640F ONLY
15	DH2-1087-000 000	C	1	PRINTED CORD	
16	DF1-0540-000 000	B	1	LENS COVER ASS'Y	
17	DA1-1702-000 000	B	1	HOOD	
18	DF1-0406-060 000	B	1	CAP, LENS	
19	DY2-1153-000 000	B	1	LEFT COVER ASS'Y	
20	DS1-5201-000 000	C	1	SPRING, COIL	
21	DG1-0852-000 000	C	1	MIC JACK C.B.A.	
22	DA1-1811-000 000	C	2	CUSHION, RUBBER	
23	DA1-1815-000 000	C	2	SCREW	
24	DF1-0537-000 000	C	1	TERMINAL, LITHIUM BATTERY	
25	DA1-2598-000 000	B	1	KNOB, GRIP	
26	DA1-2604-000 000	B	1	CAP, AV	
27	XA1-7260-709 000	F	4	SCREW, CROSS-RECESS, PH	
28	DH9-0389-000 000	C	1	MICROPHONE ASS'Y	
29	DA1-2609-000 000	B	1	COVER, BATTERY	
30	DY2-1127-000 000	B	1	RIGHT COVER, GRIP	
31	DA1-2460-000 000	B	1	KNOB, T/W	
32	DA1-2461-000 000	C	1	PLATE	
33	XA9-0503-000 000	F	3	SCREW, CROSS-RECESS, PH	
34	DY2-6017-000 000	B	1	SPORTS FINDER SF-100	
35	DA1-2550-000 000	B	1	RING, E.V.F.	
36	DA1-1864-000 000	B	1	RING, RUBBER	
37	DY2-1159-000 000	C	1	CRT ASS'Y	
38	DA1-2463-000 000	C	2	TERMINAL, BATTERY	
39	DG1-0930-000 000	C	1	GRIP C.B.A.	
40	XA4-9200-409 000	F	3	SCREW, CROSS-RECESS, PH	
41	DY2-1155-000 000	B	1	LEFT COVER, GRIP	
42	DA1-2409-000 000	B	1	SEAL	
43	XA9-0435-000 000	F	2	SCREW, CROSS-RECESS, PH	
44	DA1-2948-000 000	B	1	STRAP, HAND	

Lens/Camera Unit Section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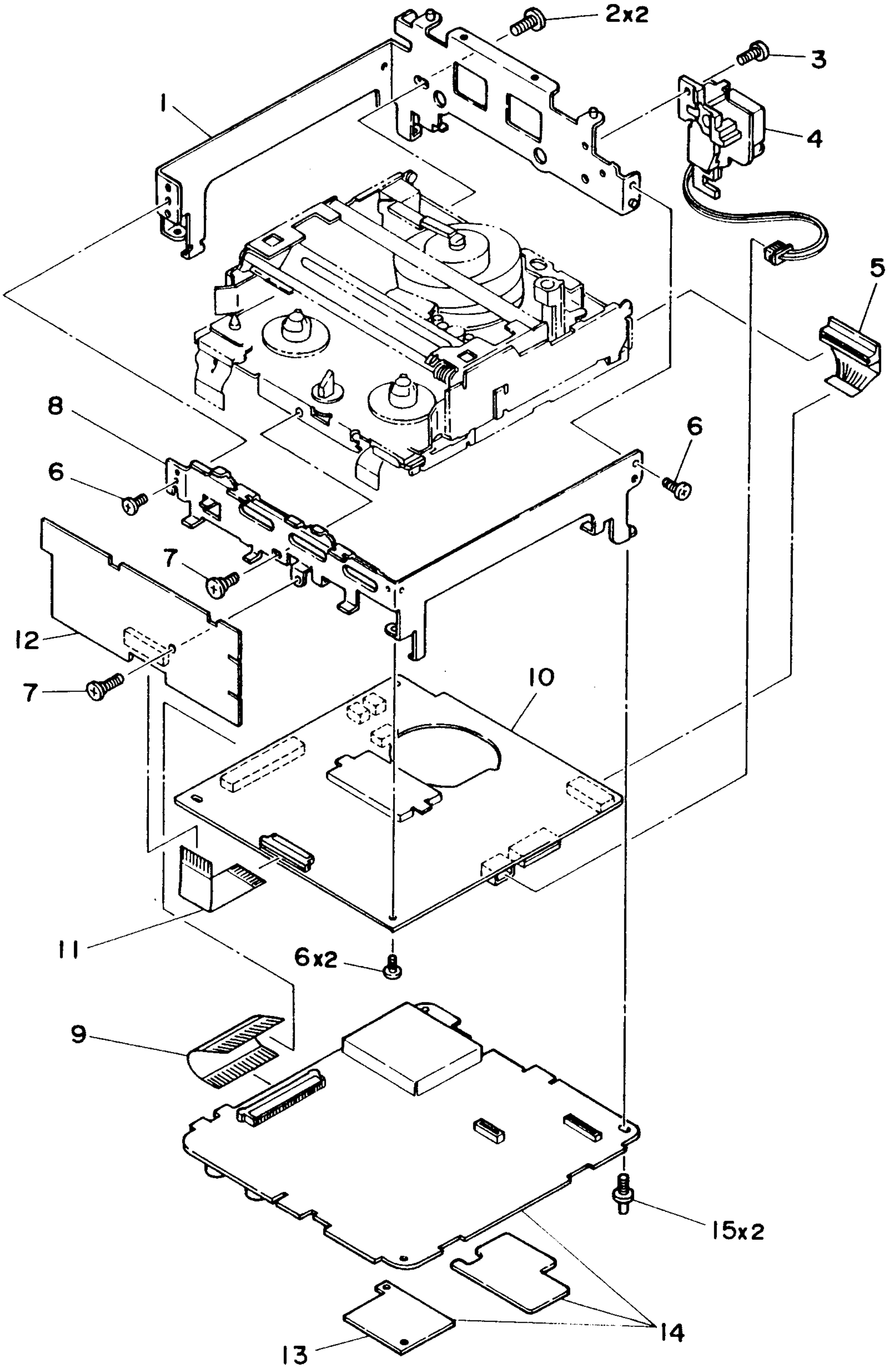
MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY1-7115-000 000	C	1	ZOOM LENS ASS'Y	
2	DY1-7116-000 000	C	1	FOCUS LENS ASS'Y	
3	DA7-1734-000 000	C	1	STOPPER, RUBBER	
4	DA7-1724-000 000	C	1	STOPPER, NEARDISTANCE	
5	XA4-4200-507 000	F	1	SCREW, CROSS-RECESS, PH	
6	X96-1723-500 000	F	1	SCREW	
7	DG9-3421-000 000	C	1	SWITCH C.B.A.	
8	DA1-2573-000 000	C	1	PLATE, TRIPOD	
9	DA1-2570-000 000	C	1	HOLDER, CAMERA	
10	DS1-5198-000 000	C	1	SPRING, COIL	
11	DF1-0542-000 000	C	1	HOLDER, DIGITAL MEMORY	
12	DY1-7118-000 000	B	1	ZOOM RING ASS'Y	
13	DA7-2003-000 000	B	1	SHEET, ZOOM	
14	DA7-1792-000 000	C	1	BLIND IG METER (B)	
15	DF7-0231-000 000	C	1	BLIND IG METER (A)	
16	DH8-0045-000 000	C	1	IG METER	
17	XA4-4170-407 000	F	1	SCREW, CROSS-RECESS, PH	
18	DA7-1458-000 000	C	1	DUMPER, RUBBER	
19	XB4-6260-607 000	F	1	SCREW M2.6X6	
20	DG9-3384-000 000	C	1	RELAY LENS ASS'Y	
21	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
22	DY1-7117-000 000	C	1	AF BLOCK ASS'Y	
23	XA4-2170-707 000	F	2	SCREW, CROSS-RECESS, PH	
24	X96-1723-610 000	F	2	SCREW, SLOTTED, SHOULDER	
25	DG9-3426-000 000	C	1	PZ MOTOR ASS'Y	
26	DG9-3425-000 000	C	1	AF MOTOR ASS'Y	
27	DG9-3420-000 000	C	1	AF MAIN C.B.A.	
28	XA4-4170-507 000	F	1	SCREW, CROSS-RECESS, PH	
29	DA1-2138-000 000	C	1	SHEET	
30	DH3-0014-000 000	C	1	DC/DC CONVERTER	
31	XA4-9200-609 000	F	4	SCREW, CROSS-RECESS, PH	
32	DH4-0242-000 000	B	1	CCD MN3761FSZ	
33	DG1-0918-000 000	C	1	SENSOR C.B.A.	
34	XA1-7200-307 000	F	6	SCREW, CROSS-RECESS, PH	
35	DG1-0919-000 000	C	1	PROCESS C.B.A.	
36	DG1-0835-000 000	C	1	CAMERA KEY (2) C.B.A.	
37	DA1-2571-000 000	C	1	HOLDER, DC/DC	
38	DH2-1088-000 000	C	1	PRINTED CORD	
39	DG1-0920-000 000	C	1	DIGITAL MEMORY C.B.A.	
40	DG1-0830-000 000	C	1	CAMERA KEY (1) C.B.A.	
41	XA4-9200-509 000	F	7	SCREW, CROSS-RECESS, PH	

Recorder Unit Section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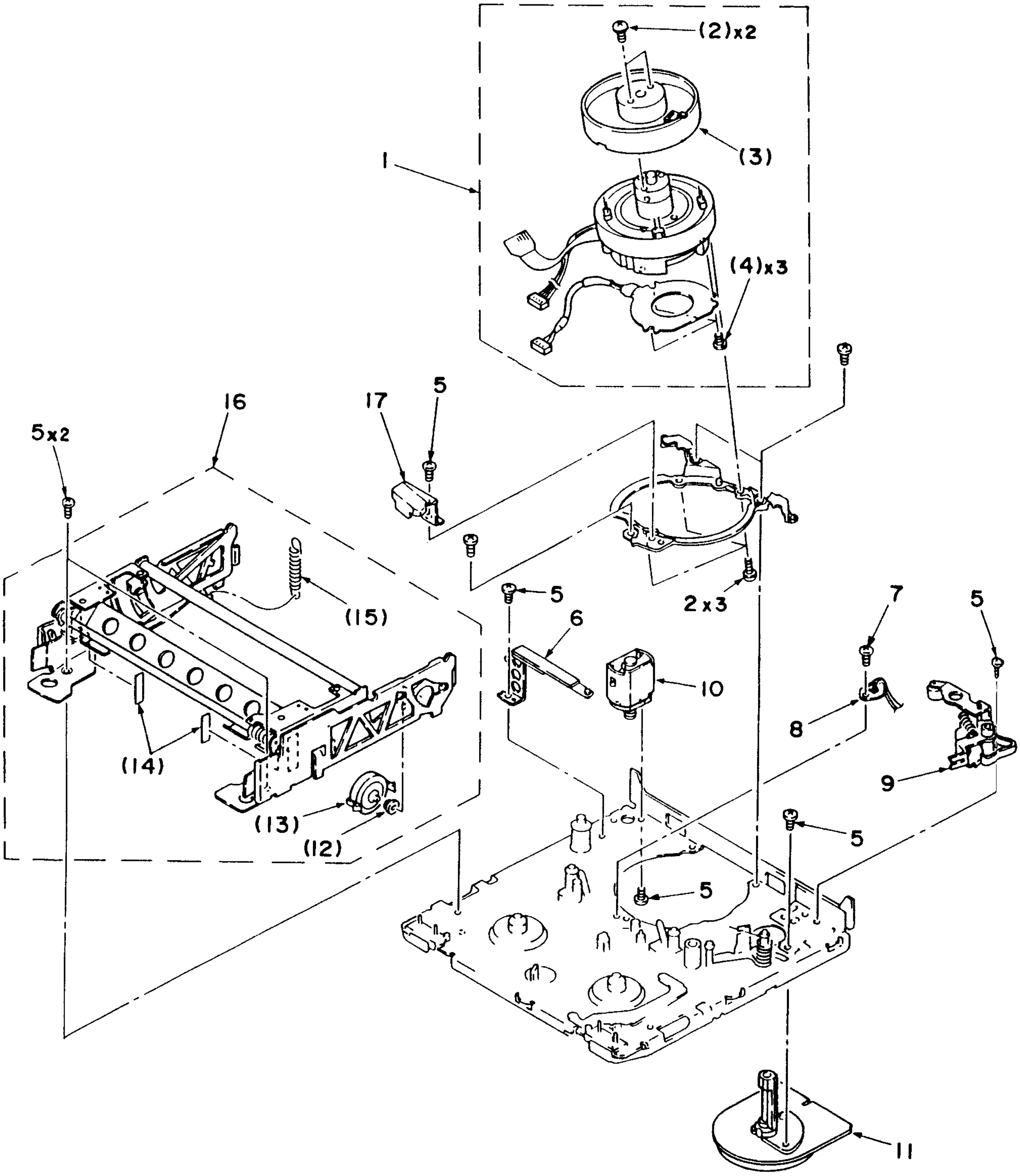
MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DF1-0535-000 000	C	1	HOLDER (A), RECORDER	
2	DA1-1948-000 000	C	2	SCREW	
3	XA1-7200-407 000	F	1	SCREW, CROSS-RECESS, PH	
4	DY2-1163-000 000	C	1	REMOCON C.B.A.	
5	DF1-0541-000 000	C	1	PRINTED CORD P.I.W/CONNECTOR	
6	XA1-7200-307 000	F	4	SCREW, CROSS-RECESS, PH	
7	DA1-1900-000 000	C	2	SCREW, CROSS-RECESS, PH	
8	DA1-2619-000 000	C	1	HOLDER (B), RECORDER	
9	DH2-1089-000 000	C	1	PRINTED CORD	
10	DG1-0912-000 000	C	1	SYSCON SERVO C.B.A.	
11	DH2-1091-000 000	C	1	PRINTED CORD	
12	DG1-0833-000 000	C	1	RECORDER KEY C.B.A.	E640F ONLY
	DY2-1162-000 000	C	1	RECORDER KEY C.B.A.	E640E ONLY
13	DG1-0832-000 000	C	1	AGC C.B.A.	
14	DG1-0926-000 000	C	1	VIDEO C.B.A.	
15	DA1-1895-000 000	F	2	SCREW	

Mechanical Chassis Section I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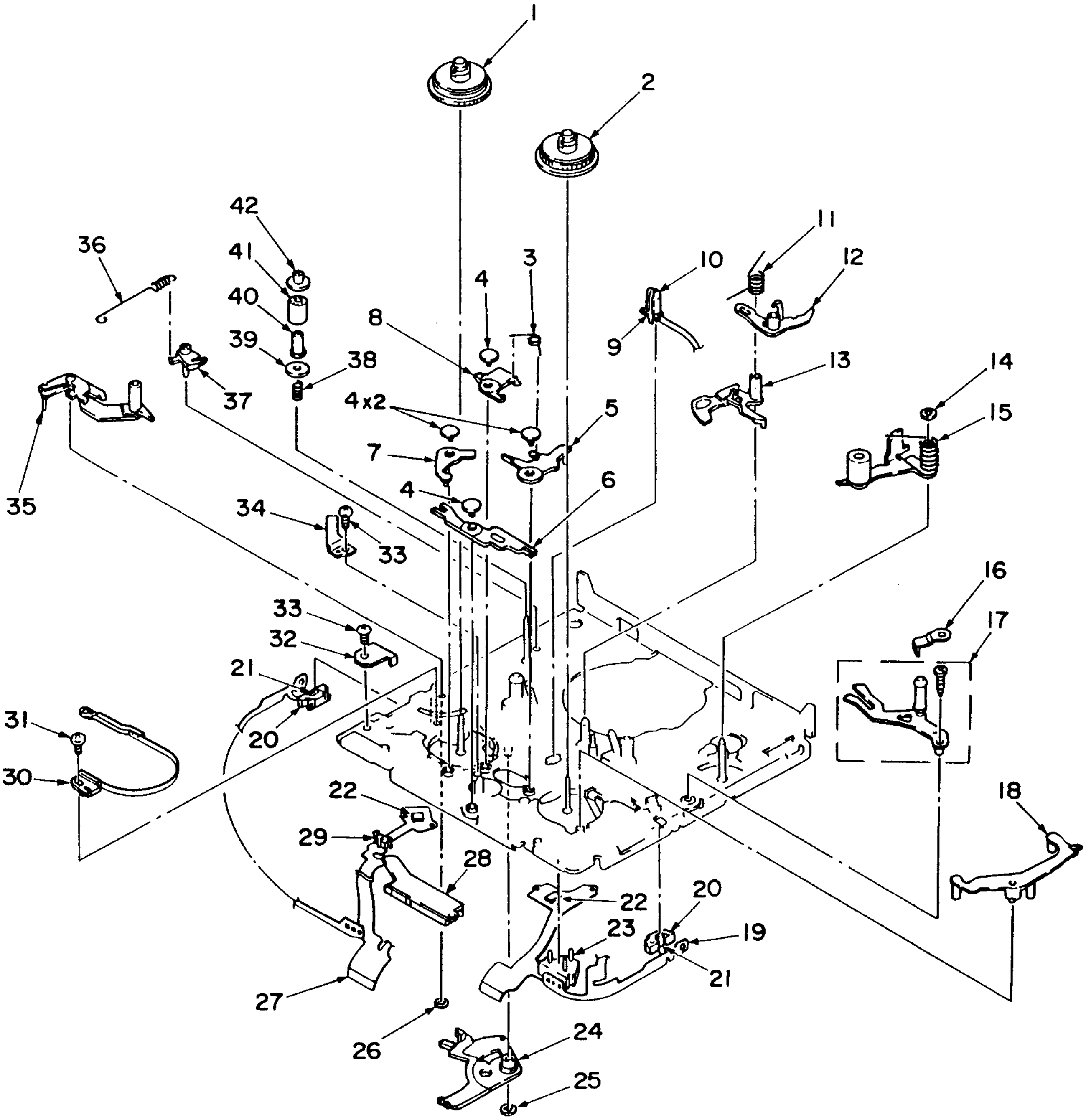
MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2732-000 000	E	1	DRUM ASS'Y	
2	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
3	DY4-2733-000 000	E	1	UPPER DRUM ASS'Y	
4	DY4-2452-000 000	F	3	SCREW, CROSS-RECESS	
5	DY4-2727-000 000	F	7	SCREW, CROSS-RECESS	
6	DY4-2675-000 000	C	1	TERMINAL, EARTH	
7	DY4-2728-000 000	F	1	SCREW, CROSS-RECESS	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
9	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
11	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
12	DY4-2720-000 000	C	1	DAMPER, OIL	
13	DY4-2709-000 000	C	1	GEAR, DUMPER	
14	DY4-2729-000 000	C	2	TAPE	
15	DY4-2708-000 000	C	1	SPRING, COIL	
16	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
17	DY4-2721-000 000	C	1	GUARD, GUIDE	

Mechanical Chassis Section 2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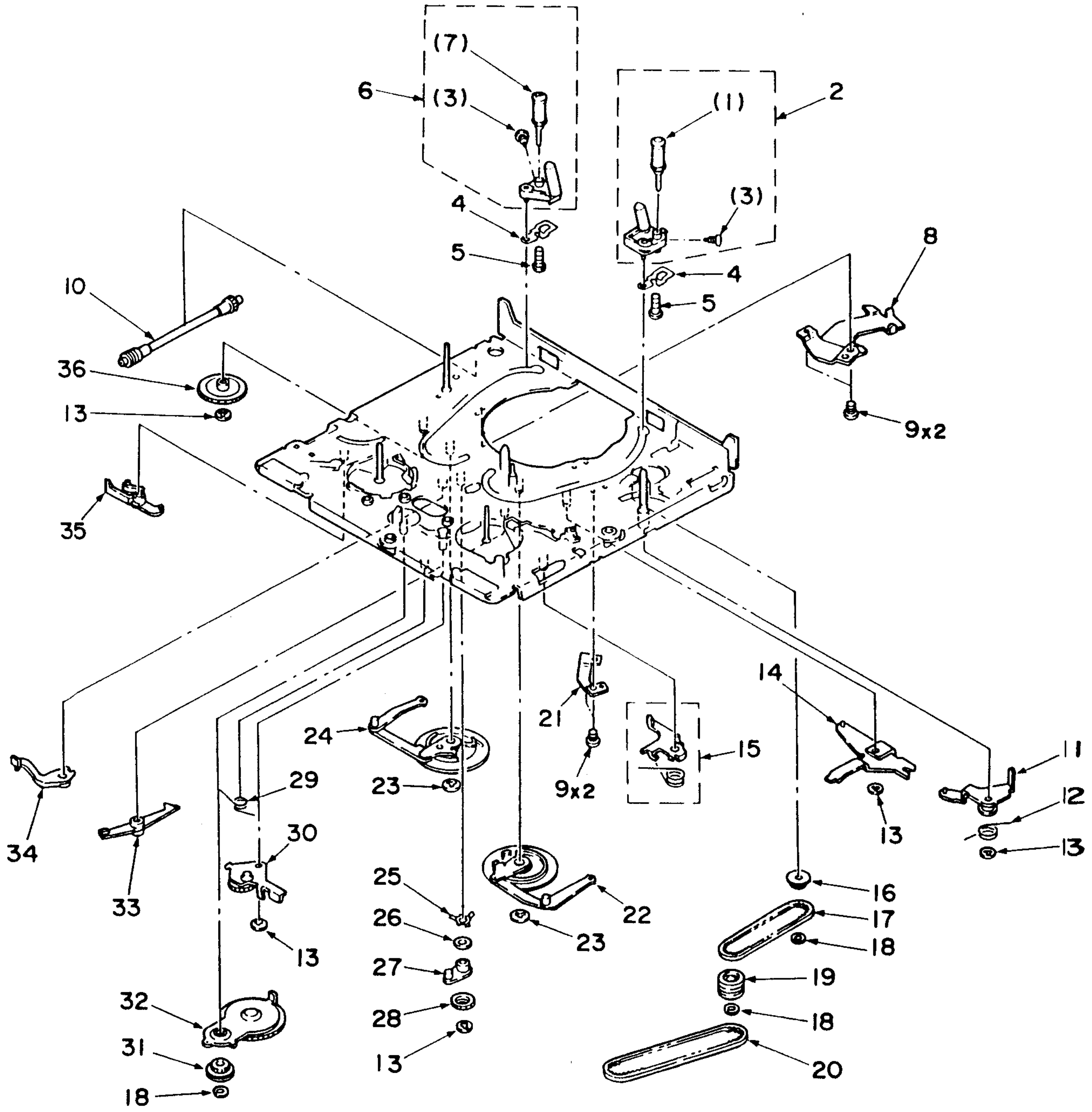
MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2663-000 000	C	1	REEL, SUPPLY	
2	DY4-2666-000 000	C	1	REEL, TAKE UP	
3	DY4-2699-000 000	C	1	SPRING, COIL	
4	DY4-2696-000 000	C	4	PIN, SHAFT	
5	DY4-2714-000 000	C	1	BRAKE, T	
6	DY4-2692-000 000	C	1	LEVER, LB	
7	DY4-2691-000 000	C	1	BRAKE, LB	
8	DY4-2713-000 000	C	1	BRAKE, S	
9	DY4-2710-000 000	C	1	HOLDER, LED	
10	Y22-8012-000 000	B	1	LED GL452S	
11	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2716-000 000	C	1	ARM, STOPPER	
13	DY4-2723-000 000	C	1	STOPPER, RK	
14	DY4-2440-000 000	F	1	WASHER	
15	DY4-2653-000 000	C	1	ARM, PINCH	
16	DY4-2707-000 000	C	1	SPRING, PLATE	
17	DY4-2664-000 000	C	1	ARM, TG7	
18	DY4-2712-000 000	C	1	ARM, RELEASE	
19	DY4-2680-000 000	C	1	RLEXIBLE P.C.B. (2)	
20	DY4-2722-000 000	C	2	HOLDER, SENSOR	
21	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	
22	Y22-8121-000 000	B	2	PHOTO IC SPI-315-25-BD	
23	DY4-2678-000 000	C	1	SWITCH, PUSH	
24	DY4-2657-000 000	C	1	LEVER, SWITCH	
25	DY4-2688-000 000	F	1	WASHER	
26	DY4-2681-000 000	F	1	WASHER	
27	DY4-2679-000 000	C	1	FLEXIBLE P.C.B. (1)	
28	DY4-2677-000 000	C	1	SWITCH, SLIDE	
29	DY4-2676-000 000	C	1	SWITCH	
30	DY4-2660-000 000	C	1	BAND, TENSION	
31	DY4-2727-000 000	F	1	SCREW, CROSS-RECESS	
32	DY4-2725-000 000	C	1	PLATE, SWITCH	
33	DY4-2728-000 000	F	2	SCREW, CROSS-RECESS	
34	DY4-2690-000 000	C	1	PLATE, TL	
35	DY4-2669-000 000	C	1	ARM	
36	DY4-2724-000 000	C	1	SPRING, COIL	
37	DY4-2717-000 000	C	1	ARM, ADJUST	
38	DY4-2705-000 000	C	1	SPRING, COIL	
39	DY4-2701-000 000	C	1	FLANGE, TG2	
40	DY4-2704-000 000	C	1	SLEEVE, TG2	
41	DY4-2702-000 000	C	1	ROLLER, TG2	
42	DY4-2703-000 000	C	1	FLANGE, TG2	

Mechanical Chassis Section 3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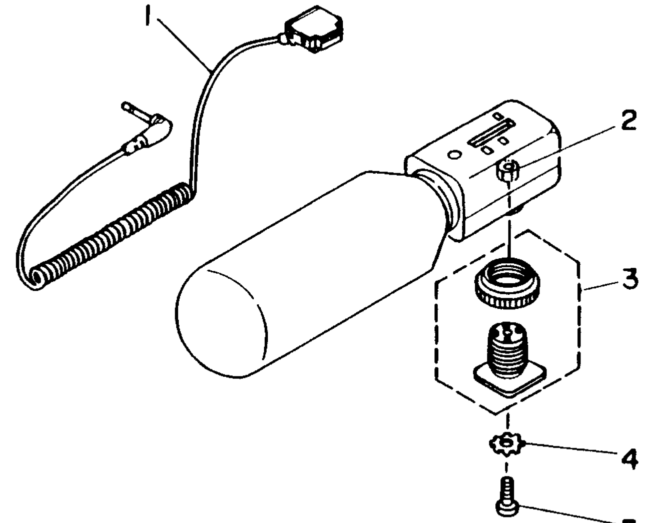
MECHANICAL PARTS

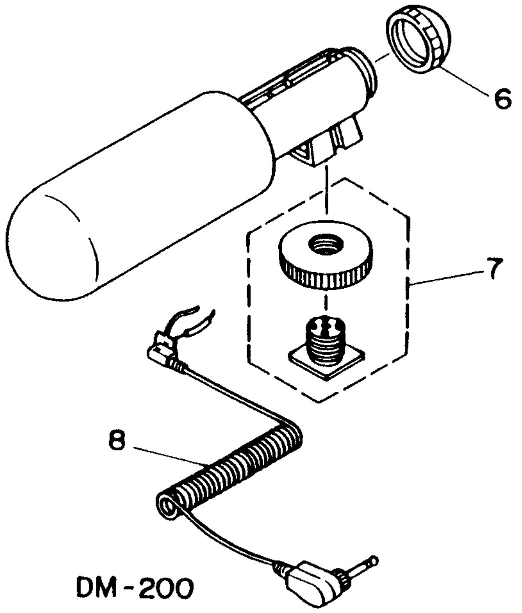
SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY4-2674-000 000	C	1	ROLLER, GUIDE	
2	DY4-2649-000 000	C	1	COASTER, RIGHT	
3	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
4	DY4-2685-000 000	C	2	SPRING, LEAF	
5	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
6	DY4-2648-000 000	C	1	COASTER, LEFT	
7	DY4-2662-000 000	C	1	ROLLER, GUIDE	
8	DY4-2672-000 000	C	1	PLATE, SS	
9	DY4-2728-000 000	F	4	SCREW, CROSS-RECESS	
10	DY4-2658-000 000	C	1	WORM ASS'Y	
11	DY4-2665-000 000	C	1	ARM, PINCH SUB	
12	DY4-2706-000 000	C	1	SPRING, COIL	
13	DY4-2688-000 000	F	5	WASHER	
14	DY4-2655-000 000	C	1	LEVER, THREADING	
15	DY4-2659-000 000	C	1	BRAKE, TS	
16	DY4-2656-000 000	C	1	GEAR, JOINT	
17	DY4-2719-000 000	E	1	BELT (S), TIMING	
18	DY4-2681-000 000	F	3	WASHER	
19	DY4-2671-000 000	C	1	PULLEY, RELAY	
20	DY4-2718-000 000	E	1	BELT (L), TIMING	
21	DY4-2684-000 000	C	1	PLATE,TT	
22	DY4-2668-000 000	C	1	GEAR	
23	DY4-2440-000 000	F	2	WASHER	
24	DY4-2667-000 000	C	1	GEAR	
25	DY4-2700-000 000	C	1	SPRING	
26	DY4-2527-000 000	F	1	WASHER	
27	DY4-2695-000 000	C	1	ARM, UL	
28	DY4-2694-000 000	C	1	GEAR, UL	
29	DY4-2698-000 000	C	1	SPRING, COIL	
30	DY4-2650-000 000	C	1	GEAR ASS'Y	
31	DY4-2661-000 000	C	1	GEAR	
32	DY4-2654-000 000	C	1	GEAR ASS'Y	
33	DY4-2693-000 000	C	1	ARM, RELEASE	
34	DY4-2715-000 000	C	1	BRAKE, UL	
35	DY4-2711-000 000	C	1	LEVER, EJECT	
36	DY4-2687-000 000	C	1	GEAR, WHEEL	

No. 7

Accessory Parts Section



DM-300



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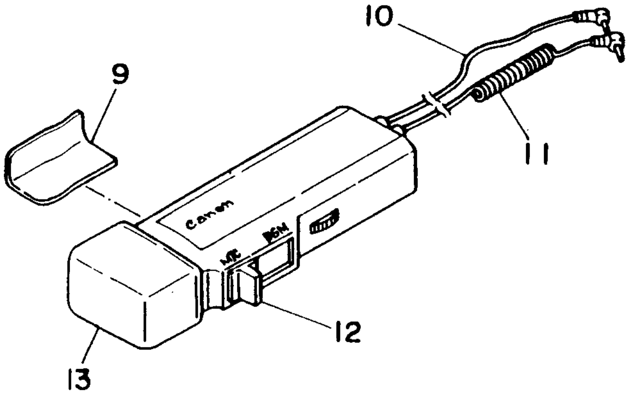
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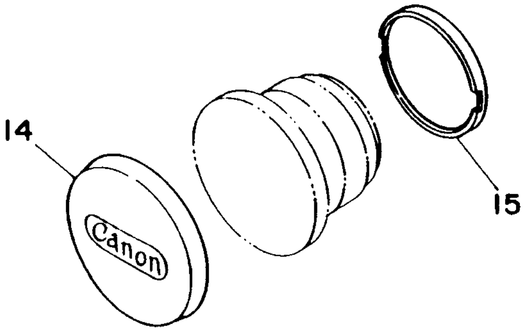
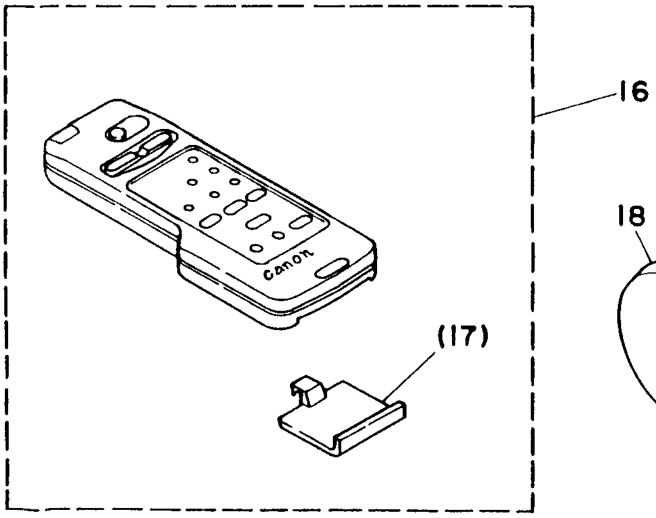
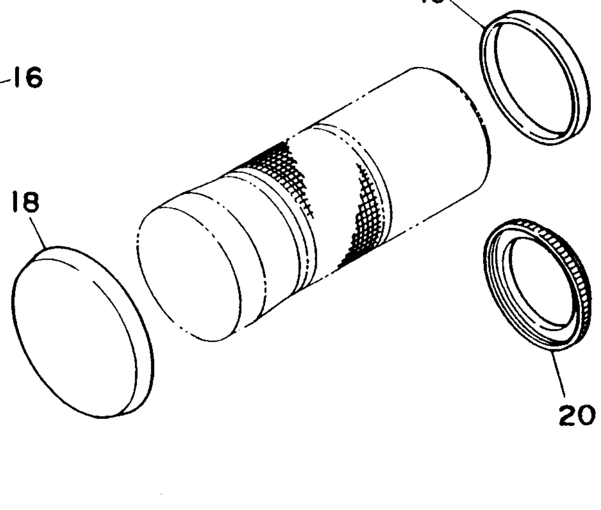


WD-46, TL-46



WL-200



TL-55L

MECHANICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
1	DY5-1467-000 000	C	1	CORD, BATTERY	
2	DY5-1468-000 000	C	1	NUT	
3	DY5-1469-000 000	C	1	SHOE ASS'Y	
4	DY5-1470-000 000	C	1	WASHER	
5	DY5-1471-000 000	C	1	SCREW, CROSS-RECESS	
6	DY5-1459-000 000	C	1	BATTERY COMPARTMENT	
7	DY5-1460-000 000	C	1	SHOE ASS'Y	
8	DY5-1461-000 000	C	1	CORD ASS'Y	
9	DA8-0178-000 000	B	1	COVER, BATTERY	
10	DH2-0812-000 000	C	1	CABLE, INPUT	
11	DH2-0813-000 000	C	1	CABLE, OUTPUT	
12	DA8-0177-000 000	B	1	KNOB, MIXING	
13	DA8-0181-000 000	B	1	WINDSCREEN	
14	DA7-1931-000 000	C	1	CAP, LENS	
15	DA7-1932-000 000	C	1	CAP, DUST	
16	DY2-1165-000 000	B	1	WIRELESS CONTROLLER WL-200	E640E ONLY
	DY2-1192-000 000	B	1	WIRELESS CONTROLLER WL-200	E640F ONLY
17	DY3-4197-000 000	B	1	COVER, BATTERY	
18	DY5-1472-000 000	C	1	CAP, LENS	
19	DY5-1473-000 000	C	1	CAP, DUST	
20	DY5-1474-000 000	C	1	RING, STEP-UP	

ELECTRICAL PARTS

	SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
⚠	C2912	VC5-9850-332 003	D	1	CAPACITOR, FILM 3300pF 100V	
⚠	C2915	VC5-9520-102 000	D	1	CAPACITOR, CERA. 1000pF 1KV	
⚠	C2917	VC6-1570-152 200	D	1	CAPACITOR, CERA. 1500pF 500V	
	CN001	VS1-0875-014 000	C	1	CONNECTOR 14P	
	CN101	VS1-1169-013 000	C	1	CONNECTOR 13P	
	CN106	DH9-0341-000 000	C	1	PIN JACK ASS'Y	
	CN107	VS1-0875-028 000	C	1	CONNECTOR 28P	
	CN411	VS1-1169-015 000	C	1	CONNECTOR 15P	
	CN601	VS1-0875-011 000	C	1	CONNECTOR 11P	
	CN602	VS1-0875-014 000	C	1	CONNECTOR 14P	
	CN604	VS1-0875-013 000	C	1	CONNECTOR 13P	
	CN605	VS1-0875-028 000	C	1	CONNECTOR 28P	
	CN611	VS1-1169-011 000	C	1	CONNECTOR 11P	
	CN2703	VS1-0875-016 000	C	1	CONNECTOR 16P	
	CN2801	VS1-1169-011 000	C	1	CONNECTOR 11P	
	CN2802	VS1-1169-016 000	C	1	CONNECTOR 16P	
	D101	WA1-0380-000 000	B	1	DIODE MA157	
	D102	WA1-0604-000 000	B	1	DIODE MA159	
	D105	WA1-0604-000 000	B	1	DIODE MA159	
	D110	WA1-0604-000 000	B	1	DIODE MA159	
	D111	WA1-1084-000 000	B	1	DIODE MA110	
	D401	WA1-0612-000 201	B	1	DIODE E10QS03	
	D402	WA1-0612-000 201	B	1	DIODE E10QS03	
	D411	WA1-0961-000 000	B	1	DIODE MA112	
	D601	WA1-0961-000 000	B	1	DIODE MA112	
	D602	WA1-0547-000 201	B	1	DIODE 1SS184	
	D603	WA1-0547-000 201	B	1	DIODE 1SS184	
	D604	WA1-0961-000 000	B	1	DIODE MA112	
	D605	WA1-0961-000 000	B	1	DIODE MA112	
	D606	WA1-0961-000 000	B	1	DIODE MA112	
	D607	WA1-0961-000 000	B	1	DIODE MA112	
	D610	WA1-0961-000 000	B	1	DIODE MA112	
	D614	WA1-0961-000 000	B	1	DIODE MA112	
	D616	WA1-0961-000 000	B	1	DIODE MA112	
	D618	WA1-0547-000 201	B	1	DIODE 1SS184	
	D619	WA1-0961-000 000	B	1	DIODE MA112	
	D620	WA1-0961-000 000	B	1	DIODE MA112	
	D621	WA1-0961-000 000	B	1	DIODE MA112	
	D622	WA1-1146-000 000	B	1	DIODE MA707	
	D623	WA1-1146-000 000	B	1	DIODE MA707	
	D2001	WA1-0961-000 000	B	1	DIODE MA112	
	D2002	WA1-1221-000 000	B	1	DIODE MA341S	
	D2051	WA1-0380-000 000	B	1	DIODE MA157	
	D2052	WA1-0961-000 000	B	1	DIODE MA112	
	D2053	WA1-0962-000 000	B	1	DIODE MA121	
	D2054	WA1-0961-000 000	B	1	DIODE MA112	
	D2055	WA1-0961-000 000	B	1	DIODE MA112	
	D2101	WA1-0380-000 000	B	1	DIODE MA157	
	D2201	WA1-0961-000 000	B	1	DIODE MA112	
	D2202	WA1-0961-000 000	B	1	DIODE MA112	
	D2203	WA1-0961-000 000	B	1	DIODE MA112	
	D2401	WA1-0961-000 000	B	1	DIODE MA112	
	D2402	WA1-0961-000 000	B	1	DIODE MA112	
	D2601	WA1-0696-000 201	B	1	DIODE MA152WA	
	D2801	WA1-0961-000 000	B	1	DIODE MA112	
	D2802	WA1-0961-000 000	B	1	DIODE MA112	
	D2803	WA1-0961-000 000	B	1	DIODE MA112	
	D2804	WA1-0989-000 000	B	1	DIODE MA3100W	
	D2805	WA1-0989-000 000	B	1	DIODE MA3100W	
	D2901	WA1-0989-000 000	B	1	DIODE MA3100W	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
D2902	WA1-0961-000 000	B	1	DIODE MA112	
D2903	WA1-0961-000 000	B	1	DIODE MA112	
D2904	WA1-1123-000 000	B	1	DIODE AG01Z	
D2905	WA1-1124-000 000	B	1	DIODE SHV02	
D2951	WA1-0961-000 000	B	1	DIODE MA112	
D2961	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
IC101	DH4-0192-000 000	B	1	IC CXA1202R	
IC102	DH4-0205-000 000	B	1	IC LVC556	
IC103	DH4-0190-000 000	B	1	IC CXA1237AR	
IC104	WA4-0509-000 201	B	1	IC NJM2043M	
IC106	DH4-0180-001 000	B	1	IC CXA1200BQ	
IC107	DH4-0139-000 000	B	1	IC CXL1502M	
IC411	DH4-0189-000 000	B	1	IC CXA1127M	
IC412	DH4-0030-000 000	B	1	IC CX20115	
IC431	DH4-0029-000 000	B	1	IC CX20114	
IC441	DH4-0135-000 000	B	1	IC CXA1204Q	
IC601	DH4-0207-000 000	B	1	IC CXP80116-527Q	
IC602	DH4-0240-000 000	B	1	IC μPD7508G-E97	
IC603	WA4-1231-000 000	B	1	IC LB1631M	
IC604	DH4-0205-000 000	B	1	IC LVC556	
IC605	WA4-1167-000 000	B	1	IC RH5RA50AA	
IC606	WA4-1293-000 000	B	1	IC PST529CMT	
IC607	WA4-0311-000 000	B	1	IC NJM2903M	
IC608	WA4-0349-000 201	B	1	IC NJM2904M	
IC609	WA3-4019-000 000	B	1	CMOS IC TC7S08F	
IC2001	DH4-0245-000 000	B	1	IC MN5139	
IC2002	DH4-0125-000 000	B	1	IC MN53015CXY	
IC2051	WA3-3900-000 000	B	1	IC μPD6147G	
IC2102	WA4-0901-000 000	B	1	IC AN2011S	
IC2151	DH4-0230-000 000	B	1	IC MN3824S	
IC2201	WA4-1075-000 000	B	1	IC AN2153NS	
IC2202	WA4-0458-000 000	B	1	IC NJM3414M	
IC2203	WA4-0264-000 000	B	1	IC NJM2902M	
IC2401	WA4-1076-000 000	B	1	IC AN2253FAP	
IC2601	DH4-0227-000 000	B	1	IC M37450M2	
IC2602	WA3-4010-000 000	B	1	IC S-2940IF01	
IC2603	WA4-1293-000 000	B	1	IC PST529CMT	
IC2604	WA3-3175-000 000	B	1	IC BU4066BF	
IC2606	WA4-0264-000 000	B	1	IC NJM2902M	
IC2801	DH4-0239-000 000	B	1	IC MB88505H-1131L	
IC2901	WA4-1322-000 000	B	1	IC AN2514S	
IC2931	DH4-0205-000 000	B	1	IC LVC556	
IC2941	DH4-0155-000 000	B	1	IC μD6145G-101	
⚠ L2902	DH9-0459-000 000	D	1	COIL 184μH	
LED001	WG1-0427-000 000	B	1	LED LT1D51A	
LED002	WG1-0427-000 000	B	1	LED LT1D51A	
Q001	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q002	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q101	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q102	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q103	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q104	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q105	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q106	WA2-1436-000 000	B	1	TRANSISTOR 2SB962-Z	
Q107	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q108	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q109	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q110	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
Q111	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q112	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q113	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q114	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q115	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q116	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q117	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q118	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q119	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q120	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q121	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q123	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q124	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q125	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q126	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q127	WA2-1230-000 000	B	1	TRANSISTOR IMH6	
Q128	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q129	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q130	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q131	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q132	WA2-1298-000 000	B	1	TRANSISTOR DTC124TK	
Q133	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q134	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q137	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q138	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q401	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q402	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q403	WA2-1368-000 000	B	1	TRANSISTOR DTC114EK	
Q404	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q411	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q431	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q432	WA2-1198-000 000	B	1	TRANSISTOR IMD2	
Q601	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q602	WA2-1249-000 201	B	1	TRANSISTOR DTC144TK	
Q603	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q605	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q606	WA2-1099-000 000	B	1	TRANSISTOR FMW1	
Q607	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q609	WA2-1099-000 000	B	1	TRANSISTOR FMW1	
Q611	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q615	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q616	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q617	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q619	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	
Q620	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q621	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q622	WA2-1237-000 000	B	1	TRANSISTOR DTA114TK	
Q623	WA2-1121-000 000	B	1	TRANSISTOR DTC143EK	
Q624	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
Q625	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2001	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q2002	WA2-1501-000 000	B	1	FET 2SK198	
Q2051	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2052	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2053	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2054	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2055	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2056	WA2-1172-000 000	B	1	TRANSISTOR 2SA1461	
Q2057	WA2-0052-000 000	B	1	TRANSISTOR 2SC1621	
Q2101	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2102	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2103	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
Q2151	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2202	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2203	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2204	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2205	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2206	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2207	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q2208	WA2-1231-000 000	B	1	TRANSISTOR IMH8	
Q2209	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2210	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2211	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2212	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2213	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2214	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q2215	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2216	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2217	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2218	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2219	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2401	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2402	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2403	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2404	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2405	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q2406	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2407	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2408	WA2-0884-000 000	B	1	TRANSISTOR DTC144EK	
Q2409	WA2-1519-000 000	B	1	TRANSISTOR 2SC2404	
Q2410	WA2-0495-000 000	B	1	TRANSISTOR 2SA1022	
Q2411	WA2-0495-000 000	B	1	TRANSISTOR 2SA1022	
Q2412	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2413	WA2-1228-000 000	B	1	TRANSISTOR IMT2	
Q2414	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2415	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2416	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2417	WA2-1351-000 201	B	1	TRANSISTOR IMD6	
Q2418	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2419	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2420	WA2-1234-000 000	B	1	TRANSISTOR IMX2	
Q2421	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2422	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q2601	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2602	WA2-1232-000 000	B	1	TRANSISTOR IMZ1	
Q2604	WA2-1256-000 000	B	1	TRANSISTOR IMH5	
Q2801	WA2-0759-000 000	B	1	TRANSISTOR DTA144EK	
Q2901	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
Q2902	WA2-1498-000 000	B	1	TRANSISTOR 2SA1162	
Q2903	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162	
Q2904	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	
Q2931	WA2-0797-000 201	B	1	TRANSISTOR 2SA1213	
Q2951	WA2-0393-000 201	B	1	TRANSISTOR 2SA1162	
Q2952	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
Q2953	WA2-0735-000 201	B	1	TRANSISTOR 2SC2712	
⚠ RR101	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR601	DH4-0144-000 000	D	1	LINK, IC ICP-F25	
⚠ RR602	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2931	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2932	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2933	DH4-0142-000 000	D	1	LINK, IC ICP-F15	
⚠ RR2934	DH4-0166-000 000	D	1	LINK, IC D2000	

ELECTRICAL PARTS

SYMBOL	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
TC601	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
⚠ T2901	DH9-0456-000 000	D	1	FLY BACK, TRANSFORMER	
VC2001	VC6-3670-100 000	C	1	CAPACITOR, TRIMMER 10pF	
VC2002	VC6-3670-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VC2401	VC6-0340-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VC2701	VC6-3670-200 000	C	1	CAPACITOR, TRIMMER 20pF	
VC2941	VC5-9700-300 000	C	1	CAPACITOR, TRIMMER 30pF	
VR101	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR102	VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
VR103	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR104	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR105	VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
VR106	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR107	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR108	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR109	VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
VR111	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR112	VR5-7780-102 000	C	1	RESISTOR, VARIABLE 1KΩ	
VR113	VR5-7780-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR381	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
VR382	VR5-7780-473 000	C	1	RESISTOR, VARIABLE 47KΩ	
VR401	VR5-8520-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR601	VR5-8520-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR603	VR5-8520-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
VR2101	VR5-8520-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2201	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2202	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2203	VR5-7780-472 000	C	1	RESISTOR, VARIABLE 4.7KΩ	
VR2204	VR5-7780-222 000	C	1	RESISTOR, VARIABLE 2.2KΩ	
VR2205	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2206	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2207	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2401	VR5-7780-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2701	VR5-5320-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2702	VR5-5320-103 000	C	1	RESISTOR, VARIABLE 10KΩ	
VR2901	VR5-7680-201 000	C	1	RESISTOR, VARIABLE 200Ω	
VR2902	VR5-7680-503 000	C	1	RESISTOR, VARIABLE 50KΩ	
VR2903	VR5-4640-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
VR2904	VR5-4640-504 000	C	1	RESISTOR, VARIABLE 500KΩ	
VR2961	VR5-7680-503 000	C	1	RESISTOR, VARIABLE 50KΩ	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
2	DA1-1702-000 000	B	1	HOOD	
2	DA1-1811-000 000	C	2	CUSHION, RUBBER	
2	DA1-1815-000 000	C	2	SCREW	
2	DA1-1857-000 000	B	1	KNOB, BATTERY EJECT	
2	DA1-1864-000 000	B	1	RING, RUBBER	
6	DA1-1895-000 000	F	2	SCREW	
6	DA1-1900-000 000	C	2	SCREW	
2	DA1-1940-000 000	B	1	SEAL, PC	
2,6	DA1-1948-000 000	C	3	SCREW	
4	DA1-2138-000 000	C	1	SHEET	
2	DA1-2386-000 000	B	2	SEAL	
2	DA1-2409-000 000	B	1	SEAL	
2	DA1-2460-000 000	B	1	KNOB, T/W	
2	DA1-2461-000 000	C	1	PLATE	
2	DA1-2463-000 000	C	2	TERMINAL, BATTERY	
2	DA1-2486-000 000	B	1	SHOE, ACCESSORY	
2	DA1-2489-000 000	B	1	SHEET, ACCESSORY SHOE	
2	DA1-2550-000 000	B	1	RING, E.V.F.	
4	DA1-2570-000 000	C	1	HOLDER, CAMERA	
4	DA1-2571-000 000	C	1	HOLDER, DC/DC	
4	DA1-2573-000 000	C	1	PLATE, TRIPOD	
2	DA1-2598-000 000	B	1	KNOB, GRIP	
2	DA1-2604-000 000	B	1	CAP, AV	
2	DA1-2609-000 000	B	1	COVER, BATTERY	
6	DA1-2619-000 000	C	1	HOLDER(B), RECORDER	
2	DA1-2948-000 000	B	1	STRAP, HAND	
4	DA7-1458-000 000	C	1	DUMPER, RUBBER	
4	DA7-1724-000 000	C	1	STOPPER, NEARDISTANCE	
4	DA7-1734-000 000	C	1	STOPPER, RUBBER	
4	DA7-1792-000 000	C	1	BLIND, IG METER (B)	
14	DA7-1931-000 000	C	1	CAP, LENS	
14	DA7-1932-000 000	C	1	CAP, DUST	
4	DA7-2003-000 000	B	1	SHEET, ZOOM	
14	DA8-0177-000 000	B	1	KNOB, MIXING	
14	DA8-0178-000 000	B	1	COVER, BATTERY	
14	DA8-0181-000 000	B	1	WINDSCREEN	
2	DF1-0406-060 000	B	1	CAP, LENS	
6	DF1-0535-000 000	C	1	HOLDER(A), RECORDER	
2	DF1-0537-000 000	C	1	TERMINAL, LITHIUM BATTERY	
2	DF1-0540-000 000	B	1	LENS COVER ASS'Y	
6	DF1-0541-000 000	C	1	PRINTED CORD P.I.W/CONNECTOR	
4	DF1-0542-000 000	C	1	HOLDER, DIGITAL MEMORY	
2	DF1-0546-000 000	B	1	COVER, CASSETTE	E640E ONLY
2	DF1-0547-000 000	B	1	COVER, CASSETTE	E640F ONLY
4	DF7-0231-000 000	C	1	BLIND, IG METER (A)	
4	DG1-0830-000 000	C	1	CAMERA KEY(1) C.B.A.	
6	DG1-0832-000 000	C	1	AGC C.B.A.	
6	DG1-0833-000 000	C	1	RECORDER KEY C.B.A.	E640F ONLY
4	DG1-0835-000 000	C	1	CAMERA KEY(2) C.B.A.	
2	DG1-0852-000 000	C	1	MIC JACK C.B.A.	
6	DG1-0912-000 000	C	1	SYSCON SERVO C.B.A.	
4	DG1-0918-000 000	C	1	SENSOR C.B.A.	
4	DG1-0919-000 000	C	1	PROCESS C.B.A.	
4	DG1-0920-000 000	C	1	DIGITAL MEMORY C.B.A.	
6	DG1-0926-000 000	C	1	VIDEO C.B.A.	
2	DG1-0930-000 000	C	1	GRIP C.B.A.	
2	DG1-0931-000 000	B	1	RIGHT COVER ASS'Y	E640F ONLY
2	DG1-0937-000 000	B	1	RIGHT COVER ASS'Y	E640E ONLY
4	DG9-3384-000 000	C	1	RELAY LENS ASS'Y	
4	DG9-3420-000 000	C	1	AF MAIN C.B.A.	

PARTS LIST

	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	4	DG9-3421-000 000	C	1	SWITCH C.B.A.	
	4	DG9-3425-000 000	C	1	AF MOTOR ASS'Y	
	4	DG9-3426-000 000	C	1	PZ MOTOR ASS'Y	
	14	DH2-0812-000 000	C	1	CABLE, INPUT	
	14	DH2-0813-000 000	C	1	CABLE, OUTPUT	
	2	DH2-1087-000 000	C	1	PRINTED CORD	
	4	DH2-1088-000 000	C	1	PRINTED CORD	
	6	DH2-1089-000 000	C	1	PRINTED CORD	
	6	DH2-1091-000 000	C	1	PRINTED CORD	
	4	DH3-0014-000 000	C	1	DC/DC CONVERTER	
		DH4-0029-000 000	B	1	IC CX20114	
		DH4-0030-000 000	B	1	IC CX20115	
		DH4-0125-000 000	B	1	IC MN53015CXY	
		DH4-0135-000 000	B	1	IC CXA1204Q	
		DH4-0139-000 000	B	1	IC CXL1502M	
⚠		DH4-0142-000 000	D	5	LINK, IC ICP-F15	
⚠		DH4-0144-000 000	D	1	LINK, IC ICP-F25	
		DH4-0155-000 000	B	1	IC µPD6145G-101	
⚠		DH4-0166-000 000	D	1	LINK, IC D2000	
		DH4-0180-001 000	B	1	IC CXA1200BQ	
		DH4-0189-000 000	B	1	IC CXA1127M	
		DH4-0190-000 000	B	1	IC CXA1237AR	
		DH4-0192-000 000	B	1	IC CXA1202R	
		DH4-0205-000 000	B	3	IC LVC556	
		DH4-0207-000 000	B	1	IC XCP80116-527Q	
		DH4-0227-000 000	B	1	IC M37450M2	
		DH4-0230-000 000	B	1	IC MN3824S	
		DH4-0239-000 000	B	1	IC MB88505H-1131L	
		DH4-0240-000 000	B	1	IC µPD7508G-E97	
	4	DH4-0242-000 000	B	1	CCD MN3761FSZ	
		DH4-0245-000 000	B	1	IC MN5139	
	4	DH8-0045-000 000	C	1	IG METER	
		DH9-0341-000 000	C	1	PIN JACK ASS'Y	
	2	DH9-0389-000 000	C	1	MICROPHONE ASS'Y	
⚠		DH9-0456-000 000	D	1	FLY BACK, TRANSFORMER	
⚠		DH9-0459-000 000	D	1	COIL 184µH	
	4	DS1-5198-000 000	C	1	SPRING, COIL	
	2	DS1-5201-000 000	C	1	SPRING, COIL	
	4	DY1-7115-000 000	C	1	ZOOM LENS ASS'Y	
	4	DY1-7116-000 000	C	1	FOCUS LENS ASS'Y	
	4	DY1-7117-000 000	C	1	AF BLOCK ASS'Y	
	4	DY1-7118-000 000	B	1	ZOOM RING ASS'Y	
	2	DY2-1127-000 000	B	1	RIGHT COVER, GRIP	
	2	DY2-1153-000 000	B	1	LEFT COVER ASS'Y	
	2	DY2-1155-000 000	B	1	LEFT COVER, GRIP	
	2	DY2-1159-000 000	C	1	CRT ASS'Y	
	6	DY2-1162-000 000	C	1	RECORDER KEY C.B.A.	E640E ONLY
	6	DY2-1163-000 000	C	1	REMOCON C.B.A.	
	14	DY2-1165-000 000	B	1	WIRELESS CONTROLLER WL-200	E640E ONLY
	2	DY2-1188-000 000	B	1	TOP COVER ASS'Y	E640E ONLY
	2	DY2-1189-000 000	B	1	TOP COVER ASS'Y	E640F ONLY
	2	DY2-1190-000 000	B	1	COVER, REAR	E640E ONLY
	2	DY2-1191-000 000	B	1	COVER, REAR	E640F ONLY
	14	DY2-1192-000 000	B	1	WIRELESS CONTROLLER WL-200	E640F ONLY
	2	DY2-6017-000 000	B	1	SPORTS FINDER SF-100	
	14	DY3-4197-000 000	B	1	COVER, BATTERY	
	10,12	DY4-2440-000 000	F	3	WASHER	
	8	DY4-2452-000 000	F	3	SCREW, CROSS-RECESS	
	12	DY4-2527-000 000	F	1	WASHER	
	12	DY4-2648-000 000	C	1	COASTER, LEFT	

PARTS LIST

PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
12	DY4-2649-000 000	C	1	COASTER, RIGHT	
12	DY4-2650-000 000	C	1	GEAR ASS'Y	
8	DY4-2651-000 000	C	1	LOADING MOTOR ASS'Y	
8	DY4-2652-000 000	C	1	ROLLER ASS'Y	
10	DY4-2653-000 000	C	1	ARM, PINCH	
12	DY4-2654-000 000	C	1	GEAR ASS'Y	
12	DY4-2655-000 000	C	1	LEVER, THREADING	
12	DY4-2656-000 000	C	1	GEAR, JOINT	
10	DY4-2657-000 000	C	1	LEVER, SWITCH	
12	DY4-2658-000 000	C	1	WORM ASS'Y	
12	DY4-2659-000 000	C	1	BLAKE, TS	
10	DY4-2660-000 000	C	1	BAND, TENSION	
12	DY4-2661-000 000	C	1	GEAR	
12	DY4-2662-000 000	C	1	ROLLER, GUIDE	
10	DY4-2663-000 000	C	1	REEL, SUPPLY	
10	DY4-2664-000 000	C	1	ARM, TG7	
12	DY4-2665-000 000	C	1	ARM, PINCH SUB	
10	DY4-2666-000 000	C	1	REEL, TAKE UP	
12	DY4-2667-000 000	C	1	GEAR	
12	DY4-2668-000 000	C	1	GEAR	
10	DY4-2669-000 000	C	1	ARM	
12	DY4-2671-000 000	C	1	PULLEY, RELAY	
12	DY4-2672-000 000	C	1	PLATE, SS	
8	DY4-2673-000 000	C	1	CASSETTE COMPARTMENT ASS'Y	
12	DY4-2674-000 000	C	1	ROLLER, GUIDE	
8	DY4-2675-000 000	C	1	TERMINAL, EARTH	
10	DY4-2676-000 000	C	1	SWITCH	
10	DY4-2677-000 000	C	1	SWITCH, SLIDE	
10	DY4-2678-000 000	C	1	SWITCH, PUSH	
10	DY4-2679-000 000	C	1	FLEXIBLE P.C.B. (1)	
10	DY4-2680-000 000	C	1	FLEXIBLE P.C.B. (2)	
10,12	DY4-2681-000 000	F	4	WASHER	
12	DY4-2684-000 000	C	1	PLATE, TT	
12	DY4-2685-000 000	C	2	SPRING, LEAF	
12	DY4-2686-000 000	F	2	SCREW, CROSS-RECESS	
12	DY4-2687-000 000	C	1	GEAR, WHEEL	
10,12	DY4-2688-000 000	F	6	WASHER	
12	DY4-2689-000 000	F	2	SCREW, CROSS-RECESS	
10	DY4-2690-000 000	C	1	PLATE, TL	
10	DY4-2691-000 000	C	1	BLAKE,LB	
10	DY4-2692-000 000	C	1	LEVER, LB	
12	DY4-2693-000 000	C	1	ARM, RELEASE	
12	DY4-2694-000 000	C	1	GEAR, UL	
12	DY4-2695-000 000	C	1	ARM, UL	
10	DY4-2696-000 000	C	4	PIN, SHAFT	
10	DY4-2697-000 000	C	1	SPRING, COIL	
12	DY4-2698-000 000	C	1	SPRING, COIL	
10	DY4-2699-000 000	C	1	SPRING, COIL	
12	DY4-2700-000 000	C	1	SPRING	
10	DY4-2701-000 000	C	1	FLANGE, TG2	
10	DY4-2702-000 000	C	1	ROLLER, TG2	
10	DY4-2703-000 000	C	1	FLANGE, TG2	
10	DY4-2704-000 000	C	1	SLEEVE, TG2	
10	DY4-2705-000 000	C	1	SPRING, COIL	
12	DY4-2706-000 000	C	1	SPRING, COIL	
10	DY4-2707-000 000	C	1	SPRING, PLATE	
8	DY4-2708-000 000	C	1	SPRING, COIL	
8	DY4-2709-000 000	C	1	GEAR, DAMPER	
10	DY4-2710-000 000	C	1	HOLDER, LED	
12	DY4-2711-000 000	C	1	LEVER, EJECT	

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	PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	10	DY4-2712-000 000	C	1	ARM, RELEASE	
	10	DY4-2713-000 000	C	1	BRAKE, S	
	10	DY4-2714-000 000	C	1	BRAKE, T	
	12	DY4-2715-000 000	C	1	BLAKE, UL	
	10	DY4-2716-000 000	C	1	ARM, STOPPER	
	10	DY4-2717-000 000	C	1	ARM, ADJUST	
	12	DY4-2718-000 000	E	1	BELT(L), TIMING	
	12	DY4-2719-000 000	E	1	BELT(S), TIMING	
	8	DY4-2720-000 000	C	1	DAMPER, OIL	
	8	DY4-2721-000 000	C	1	GUARD, GUIDE	
	10	DY4-2722-000 000	C	2	HOLDER, SENSOR	
	10	DY4-2723-000 000	C	1	STOPPER, RK	
	10	DY4-2724-000 000	C	1	SPRING, COIL	
	10	DY4-2725-000 000	C	1	PLATE, SWITCH	
	8	DY4-2726-000 000	C	1	CAPSTAN MOTOR	
	8,10	DY4-2727-000 000	F	8	SCREW, CROSS-RECESS	
	8,10,12	DY4-2728-000 000	F	7	SCREW, CROSS-RECESS	
	8	DY4-2729-000 000	C	2	TAPE	
	8	DY4-2730-000 000	F	5	SCREW, CROSS-RECESS	
	8	DY4-2732-000 000	E	1	DRUM ASS'Y	
	8	DY4-2733-000 000	E	1	UPPER DRUM ASS'Y	
	14	DY5-1459-000 000	C	1	BATTERY COMPARTMENT	
	14	DY5-1460-000 000	C	1	SHOE ASS'Y	
	14	DY5-1461-000 000	C	1	CORD ASS'Y	
	14	DY5-1467-000 000	C	1	CORD BATTERY	
	14	DY5-1468-000 000	C	1	NUT	
	14	DY5-1469-000 000	C	1	SHOE ASS'Y	
	14	DY5-1470-000 000	C	1	WASHER	
	14	DY5-1471-000 000	C	1	SCREW, CROSS-RECESS	
	14	DY5-1472-000 000	C	1	CAP, LENS	
	14	DY5-1473-000 000	C	1	CAP, DUST	
	14	DY5-1474-000 000	C	1	RING, STEP-UP	
⚠		VC5-9520-102 000	D	1	CAPACITOR, CERA. 1000pF 1KV	
		VC5-9700-300 000	C	1	CAPACITOR, TRIMMER 30pF	
⚠		VC5-9850-332 003	D	1	CAPACITOR, FILM 3300pF 100V	
		VC6-0340-300 000	C	2	CAPACITOR, TRIMMER 30pF	
⚠		VC6-1570-152 200	D	1	CAPACITOR, CERA. 1500pF 500V	
		VC6-3670-100 000	C	1	CAPACITOR, TRIMMER 10pF	
		VC6-3670-200 000	C	2	CAPACITOR, TRIMMER 20pF	
		VR5-4640-205 000	C	1	RESISTOR, VARIABLE 2MΩ	
		VR5-4640-504 000	C	1	RESISTOR, VARIABLE 500KΩ	
		VR5-5320-103 000	C	2	RESISTOR, VARIABLE 10KΩ	
		VR5-7680-201 000	C	1	RESISTOR, VARIABLE 200Ω	
		VR5-7680-503 000	C	2	RESISTOR, VARIABLE 50KΩ	
		VR5-7780-102 000	C	2	RESISTOR, VARIABLE 1KΩ	
		VR5-7780-103 000	C	8	RESISTOR, VARIABLE 10KΩ	
		VR5-7780-222 000	C	3	RESISTOR, VARIABLE 2.2KΩ	
		VR5-7780-223 000	C	3	RESISTOR, VARIABLE 22KΩ	
		VR5-7780-332 000	C	1	RESISTOR, VARIABLE 3.3KΩ	
		VR5-7780-471 000	C	1	RESISTOR, VARIABLE 470Ω	
		VR5-7780-472 000	C	2	RESISTOR, VARIABLE 4.7KΩ	
		VR5-7780-473 000	C	2	RESISTOR, VARIABLE 47KΩ	
		VR5-8520-103 000	C	3	RESISTOR, VARIABLE 10KΩ	
		VR5-8520-223 000	C	1	RESISTOR, VARIABLE 22KΩ	
		VS1-0875-011 000	C	1	CONNECTOR 11P	
		VS1-0875-013 000	C	1	CONNECTOR 13P	
		VS1-0875-014 000	C	2	CONNECTOR 14P	
		VS1-0875-016 000	C	1	CONNECTOR 16P	
		VS1-0875-028 000	C	2	CONNECTOR 28P	
		VS1-1169-011 000	C	2	CONNECTOR 11P	

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PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	VS1-1169-013 000	C	1	CONNECTOR 13P	
	VS1-1169-015 000	C	1	CONNECTOR 15P	
	VS1-1169-016 000	C	1	CONNECTOR 16P	
	WA1-0380-000 000	B	3	DIODE MA157	
	WA1-0384-000 000	B	1	ZENER DIODE RD5.6MB2	
	WA1-0547-000 201	B	3	DIODE 1SS184	
	WA1-0604-000 000	B	3	DIODE MA159	
	WA1-0612-000 201	B	2	DIODE E10QS03	
	WA1-0696-000 201	B	1	DIODE MA152WA	
	WA1-0961-000 000	B	27	DIODE MA112	
	WA1-0962-000 000	B	1	DIODE MA121	
	WA1-0989-000 000	B	3	DIODE MA3100W	
	WA1-1084-000 000	B	1	DIODE MA110	
	WA1-1123-000 000	B	1	DIODE AG01Z	
	WA1-1124-000 000	B	1	DIODE SHV02	
	WA1-1146-000 000	B	2	DIODE MA707	
	WA1-1221-000 000	B	1	DIODE MA341S	
	WA2-0052-000 000	B	3	TRANSISTOR 2SC1621	
	WA2-0393-000 201	B	2	TRANSISTOR 2SA1162	
	WA2-0481-000 000	B	1	TRANSISTOR 2SD968A	
	WA2-0495-000 000	B	2	TRANSISTOR 2SA1022	
	WA2-0646-000 000	B	1	TRANSISTOR 2SD1328	
	WA2-0735-000 201	B	20	TRANSISTOR 2SC2712	
	WA2-0759-000 000	B	5	TRANSISTOR DTA144EK	
	WA2-0760-000 000	B	1	TRANSISTOR DTC114TK	
	WA2-0797-000 201	B	4	TRANSISTOR 2SA1213	
	WA2-0839-000 000	B	1	TRANSISTOR 2SA1226	
	WA2-0884-000 000	B	11	TRANSISTOR DTC144EK	
	WA2-1099-000 000	B	2	TRANSISTOR FMW1	
	WA2-1121-000 000	B	2	TRANSISTOR DTC143EK	
	WA2-1172-000 000	B	3	TRANSISTOR 2SA1461	
	WA2-1198-000 000	B	1	TRANSISTOR IMD2	
	WA2-1228-000 000	B	3	TRANSISTOR IMT2	
	WA2-1230-000 000	B	2	TRANSISTOR IMH6	
	WA2-1231-000 000	B	2	TRANSISTOR IMH8	
	WA2-1232-000 000	B	15	TRANSISTOR IMZ1	
	WA2-1234-000 000	B	14	TRANSISTOR IMX2	
	WA2-1237-000 000	B	4	TRANSISTOR DTA114TK	
	WA2-1248-000 000	B	1	TRANSISTOR DTA124EK	
	WA2-1249-000 201	B	1	TRANSISTOR DTC144TK	
	WA2-1256-000 000	B	5	TRANSISTOR IMH5	
	WA2-1298-000 000	B	1	TRANSISTOR DTC124TK	
	WA2-1351-000 201	B	1	TRANSISTOR IMD6	
	WA2-1368-000 000	B	4	TRANSISTOR DTC114EK	
	WA2-1436-000 000	B	1	TRANSISTOR 2SB962-Z	
	WA2-1498-000 000	B	12	TRANSISTOR 2SA1162	
	WA2-1501-000 000	B	1	FET 2SK198	
	WA2-1519-000 000	B	1	TRANSISTOR 2SC2404	
	WA3-3175-000 000	B	1	IC BU4066BF	
	WA3-3900-000 000	B	1	IC µPD6147G	
	WA3-4010-000 000	B	1	IC S-2940IF01	
	WA3-4019-000 000	B	1	CMOS IC TC7S08F	
	WA4-0264-000 000	B	2	IC NJM2902M	
	WA4-0311-000 000	B	1	IC NJM2903M	
	WA4-0349-000 201	B	1	IC NJM2904M	
	WA4-0458-000 000	B	1	IC NJM3414M	
	WA4-0509-000 201	B	1	IC NJM2043M	
	WA4-0901-000 000	B	1	IC AN2011S	
	WA4-1075-000 000	B	1	IC AN2153NS	
	WA4-1076-000 000	B	1	IC AN2253FAP	

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PAGE	PART NO.	CLASS	QTY	DESCRIPTION	REMARKS
	WA4-1167-000 000	B	1	IC RH5RA50AA	
	WA4-1231-000 000	B	1	IC LB1631M	
	WA4-1293-000 000	B	2	IC PST529CMT	
	WA4-1322-000 000	B	1	IC AN2514S	
	WG1-0427-000 000	B	2	LED LT1D51A	
2,4,6	XA1-7200-307 000	F	12	SCREW, CROSS-RECESS, PH	
6	XA1-7200-407 000	F	1	SCREW, CROSS-RECESS, PH	
2	XA1-7200-409 000	F	5	SCREW, CROSS-RECESS, PH	
2	XA1-7200-509 000	F	3	SCREW, CROSS-RECESS, PH	
2	XA1-7260-709 000	F	4	SCREW, CROSS-RECESS, PH	
4	XA4-2170-707 000	F	2	SCREW, CROSS-RECESS, PH	
4	XA4-4170-407 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4170-507 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-4200-507 000	F	1	SCREW, CROSS-RECESS, PH	
4	XA4-9170-557 000	F	3	SCREW, CROSS-RECESS, PH	
2	XA4-9200-409 000	F	3	SCREW, CROSS-RECESS, PH	
4	XA4-9200-509 000	F	7	SCREW, CROSS-RECESS, PH	
4	XA4-9200-609 000	F	4	SCREW, CROSS-RECESS, PH	
2	XA9-0435-000 000	F	2	SCREW, CROSS-RECESS, PH	
2	XA9-0449-000 000	F	11	SCREW, CROSS-RECESS, PH	
2	XA9-0503-000 000	F	3	SCREW, CROSS-RECESS, PH	
4	XB4-6260-607 000	F	1	SCREW, M2.6x6	
4	X96-1723-500 000	F	1	SCREW	
4	X96-1723-610 000	F	2	SCREW, SLOTTED, SHOULDER	
10	Y22-8012-000 000	B	1	LED GL452S	
8	Y22-8120-000 000	B	1	SENSOR, DEW	
10	Y22-8121-000 000	B	2	PHOTO IC SPI-315-25-BD	
10	Y22-8123-000 000	B	2	PHOTO TRANSISTOR EE-P109	

CONTENTS

CHAPTER IV. DIAGRAMS

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2-2 Syscon-servo section IV-3
2-3 Audio-video section IV-4

3. Circuit Board/Schematic Diagrams

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3-2 PROCESS•CAMERA-KEY C.B.A. IV-7,8
3-3 SYSCON-SERVO•RECORDER-KEY(1) C.B.A. IV-9,10
3-4 VIDEO C.B.A. IV-11,12

<Gudie to diagrams>

1. Color coding

(1) Single lines in block diagrams

Camera section
Red (———) : Y/Y+C
(– – – –) : C

Video section
Red (———) : Recording
(– – – –) : Playback

Syscon-servo section
Red (———) : Drum servo signal
(– – – –) : Capstan servo signal

(2) Voltage on circuit diagram

Red : Recording
Black : Playback

(3) Signal lines on circuit diagrams

Camera section
Red : Power supply line
Blue : Luminance signal
Orange : Chrominance signal
Netted black (▒▒▒) : Luminance + Chromiannce signals

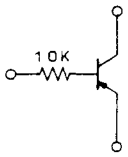
Recorder section
Blue (———) : Capstan PWM signal
(– – – –) : Capstan ATF signal
(—·—) : Capstan FG signal
Orange (———) : Drum PWM signal
(– – – –) : Drum FG signal
(—·—) : Drum PG signal

Recorder section
Netted balck (▒▒▒): Recording luminance + Chrominance signals
(▦▦▦): Playback luminance + Chrominance signals
Blue (———) : Recording luminance signal
(– – – –) : Playback luminance signal
Orange (———) : Recording chrominance signal
(– – – –) : Playback chrominance signal
Red (———) : Recording audio signal
(– – – –) : Playback audio signal

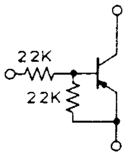
(4) PC board layout

Orange : Component side
Netted black (▒▒▒) : Soldering side
Black : Parts on component side
Blue : Parts on soldering side

2. Equivalent circuits of digital transistor



DTA114TK



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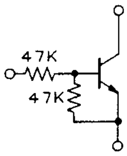

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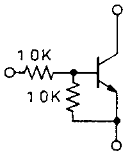

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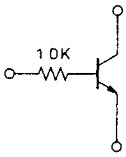

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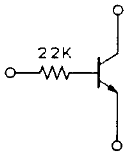

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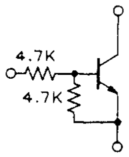

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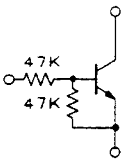

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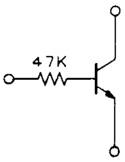
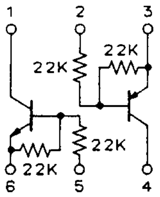
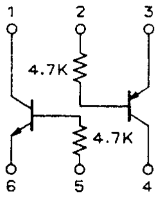


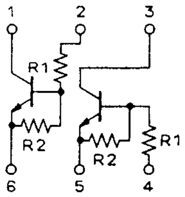
DTC144TK


1
2
3
22K
22K
22K
22K
6
5
4

IMD2

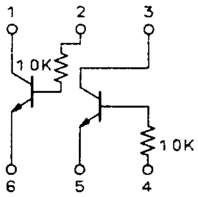

1
2
3
4.7K
4.7K
6
5
4

IMD6


1
2
3
R1
R2
R2
R1
6
5
4

IMH5
R1, R2 : 22K

IMH6
R1, R2 : 47K


1
2
3
10K
10K
6
5
4

IMH8

3. Indications on circuit diagram

- Resistance is represented in ohms (Ω).
- Capacitance is represented in farads (F).
- Wattage of resistor is 1/16 W unless otherwise specified.
- Voltages are measured with a digital voltmeter.
- Waveform photographs are taken by using a 10:1 probe.
- IC No. in each C.B.A.s are listed on the bottom of diagrams.
- No. colored in blue are corresponded to the No. of waveform photographs.
- Voltage values indicated in circuit diagram are based on the following condition.

Camera section

Colorbar, standard angle of view, AWB-preset

Recorder section

Recording : Colorbar (pattern generator)
Playback : Self-recording Playback (Color bar)

INTERCONNECTION DIAGRAM

AF C.B.A.	
CN4001	
1	+5V (SPC)
2	SPC B
3	+3V
4	SPC A
5	GND (SPC)
CN4002	
1	IRED A
2	IRED K
CN4003	
1	AF FAR Ⓗ
2	AF NEAR Ⓗ
3	GND
4	AF MOTOR PG
5	CAMERA 5V
CN4004	
1	FOCUS AREA 1
2	GND
3	ZOOM AREA
4	FOCUS AREA 2
5	CAMERA 5V
6	GND
CN4005	
1	WIDE Ⓗ
2	TELE Ⓗ
3	GND
4	ZOOM MOTOR PG
5	CAMERA 5V
CN4006	
1	UNREG 6V
2	GND
CN4007	
1	CAMERA 5V
2	GND
3	TELE Ⓗ
4	WIDE Ⓗ
5	CAMERA 5V
6	AF-DATA
7	AF-STROBE
8	REMOCON ON Ⓛ

SENSOR C.B.A.	
CN2001	
1	UNREG 6V
2	GND
CN2002	
1	HD
2	VD
3	SC
4	GND
5	SC (90)
6	CP2 + C BLK
7	SYNC
8	BF
9	WHD
10	CP2
11	C BLK
12	PLL
CN2003	
1	W BLK
2	CSP2
3	CSP1
4	CP2 + P BLK
5	FH/2
6	CPOB
7	GND
8	S/H OUT
9	C1H
10	C0H
11	Y1H
12	Y0H
CN2004	
1	+9V
2	CAMERA 5V
3	+15V
4	GND
5	−8V
6	GND
7	CAMERA ON Ⓛ
8	UNREG 6V
CN2005	
1	GND
2	CAMERA 5V
3	+9V
CW2001	
1	GND
2	CAMERA 5V
3	CAMERA ON Ⓛ
4	SHUTTER 1
5	SHUTTER 2
6	SHUTTER 3

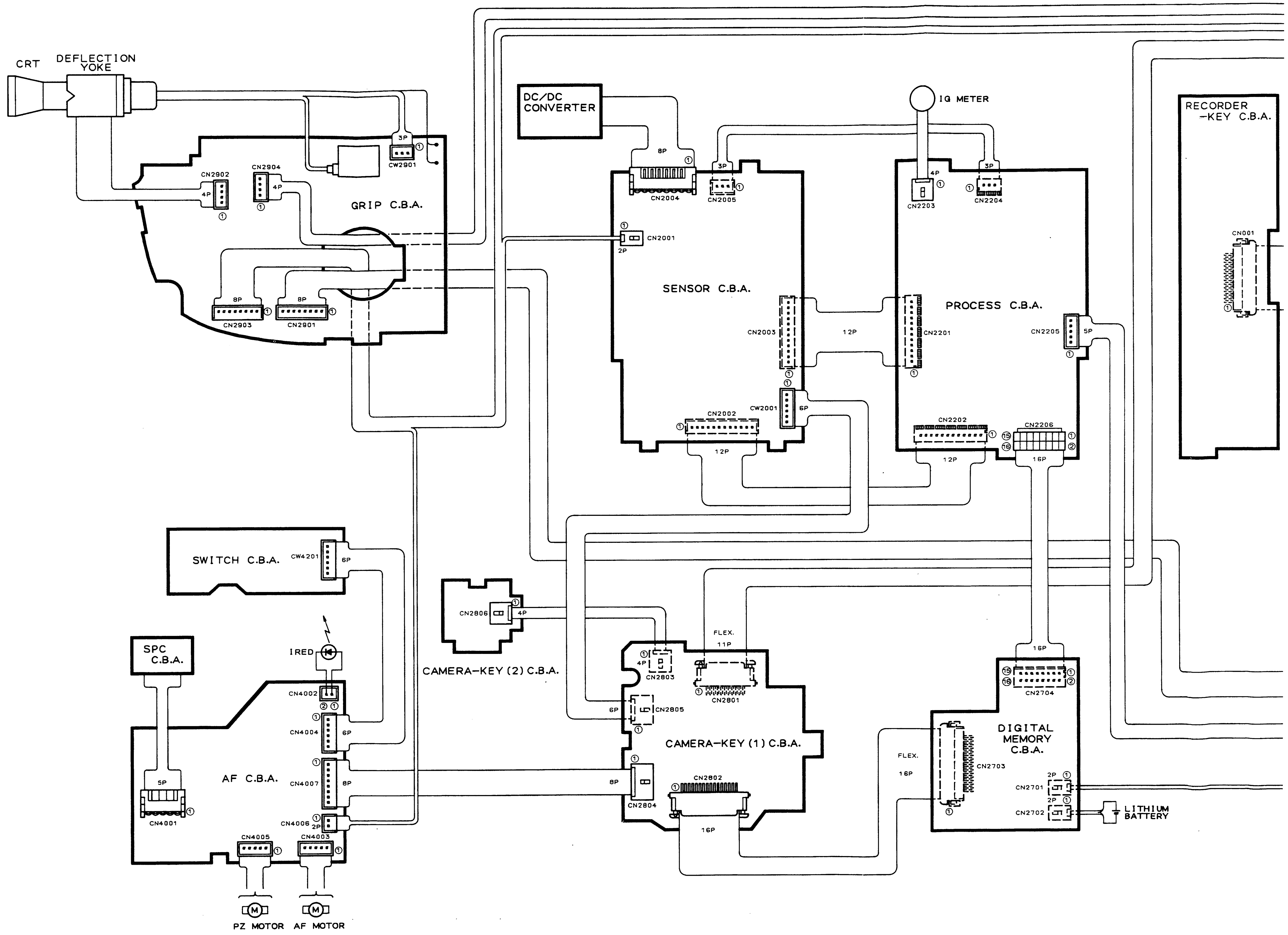
PROCESS C.B.A.	
CN2201	
1	W BLK
2	CSP2
3	CSP1
4	CP2 + P BLK
5	FH/2
6	CPOB
7	GND
8	S/H OUT
9	C1H
10	C0H
11	Y1H
12	Y0H
CN2202	
1	HD
2	VD
3	SC
4	GND
5	SC (90)
6	CP2 + C BLK
7	SYNC
8	BF
9	WHD
10	CP2
11	C BLK
12	PLL
CN2203	
1	D+
2	C+
3	D−
4	C−
CN2204	
1	GND
2	CAMERA 5V
3	+9V
CN2205	
1	CAMERA (C)
2	GND
3	CAMERA (Y)
4	GND
5	CAMERA FADE
CN2206	
1	B−Y (DM OUT)
2	R−Y (DM OUT)
3	+1.8V
4	B−Y (PRO OUT)
5	R−Y (PRO OUT)
6	Y (PRO OUT)
7	Y (DM OUT)
8	DM BLANK Ⓗ
9	GND
10	HD
11	VD
12	C BLK
13	CAMERA 5V
14	NC
15	FAWB Ⓗ
16	SAMPLE FADE Ⓗ

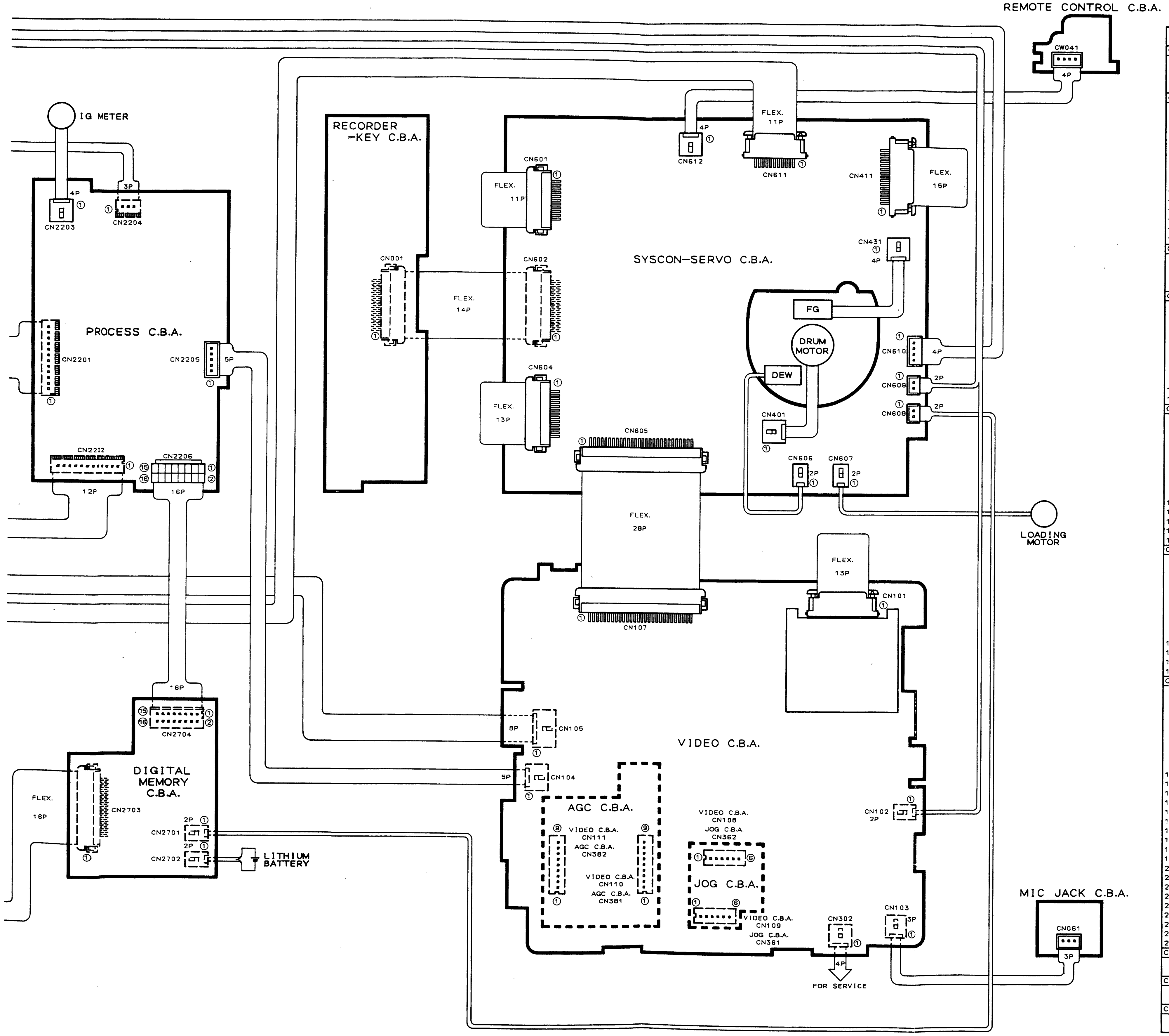
GRIP C.B.A.	
CN2901	
1	GND
2	CLOCK 1
3	VC-DATA
4	GND
5	CG-STROBE
6	CHARACTOR
7	EVF ON Ⓛ
8	EVF VIDEO
CN2902	
1	H+
2	H−
3	V+
4	V−
CN2903	
1	UNREG 6V
2	GND
3	UNREG 6V
4	GND
5	UNREG 6V
6	GND
7	UNREG 6V
8	GND
CN2904	
1	TRIG. SW Ⓛ
2	TELE Ⓗ
3	WIDE Ⓗ
4	BATT.
CW2901	
1	H
2	G1
3	K

DIGITAL MEMORY C.B.A.	
CN2701	
1	LITHIUM 3V
2	GND
CN2702	
1	LITHIUM 3V
2	GND
CN2703	
1	GND
2	EVER 5V
3	SEE THROUGH Ⓗ
4	SRAM-CS
5	R
6	G
7	B
8	IMPOSE Ⓗ
9	MEMORY Ⓗ
10	INVERT Ⓗ
11	SAMPLE LEVEL
12	VD
13	GND
14	NC
15	FAWB Ⓗ
16	SAMPLE FADE Ⓗ
CN2704	
1	B−Y (DM OUT)
2	R−Y (DM OUT)
3	+1.8V
4	B−Y (PRO OUT)
5	R−Y (PRO OUT)
6	Y (PRO OUT)
7	Y (DM OUT)
8	DM BLANK Ⓗ
9	GND
10	HD
11	VD
12	C BLK
13	CAMERA 5V
14	NC
15	FAWB Ⓗ
16	SAMPLE FADE Ⓗ

CAMERA-KEY (1) C.B.A.	
CN2801	
1	EVER 5V
2	RESET Ⓛ
3	CAMERA ON Ⓛ
4	REMOCON ON Ⓛ
5	GND
6	CLOCK 2
7	K-DATA
8	K-DATA
9	CAMERA-CS
10	TELE Ⓗ
11	WIDE Ⓗ
CN2802	
1	GND
2	EVER 5V
3	SEE THROUGH Ⓗ
4	SRAM-CS
5	R
6	G
7	B
8	IMPOSE Ⓗ
9	MEMORY Ⓗ
10	INVERT Ⓗ
11	SAMPLE LEVEL
12	VD
13	GND
14	NC
15	FAWB Ⓗ
16	SAMPLE FADE Ⓗ
CN2803	
	KEY IN 0
	KEY IN 1
	KEY IN 2
	KEY OUT 2
CN2804	
1	CAMERA 5V
2	GND
3	TELE Ⓗ
4	WIDE Ⓗ
5	CAMERA 5V
6	AF-DATA
7	AF-STROBE
8	REMOCON ON Ⓛ
CN2805	
1	GND
2	CAMERA 5V
3	CAMERA ON Ⓛ
4	SHUTTER 1
5	SHUTTER 2
6	SHUTTER 3

CAMERA-KEY (2) C.B.A.	
CN2806	
1	KEY IN 0
2	KEY IN 1
3	KEY IN 2
4	KEY OUT 2


CRT
DEFLECTION YOKE
3P
CW2901
CN2902
4P
CN2904
4P
GRIP C.B.A.
8P
CN2903
8P
CN2901
DC/DC CONVERTER
8P
CN2004
3P
CN2005
CN2001
2P
SENSOR C.B.A.
CN2003
12P
CW2001
6P
CN2002
12P
IG METER
4P
CN2203
3P
CN2204
PROCESS C.B.A.
CN2201
CN2205
5P
CN2202
12P
CN2206
16P
RECORDER -KEY C.B.A.
CN001
SWITCH C.B.A.
CW4201
6P
SPC C.B.A.
IRED
CN4002
CN4004
6P
AF C.B.A.
CN4007
8P
5P
CN4001
CN4006
2P
CN4005
CN4003
PZ MOTOR
AF MOTOR
CN2806
4P
CAMERA-KEY (2) C.B.A.
FLEX.
11P
4P
CN2803
CN2801
6P
CN2805
CAMERA-KEY (1) C.B.A.
8P
CN2804
CN2802
16P
FLEX.
16P
16P
CN2704
DIGITAL MEMORY C.B.A.
CN2703
2P
CN2701
2P
CN2702
LITHIUM BATTERY


REMOTE CONTROL C.B.A.
CW041
4P
IG METER
4P
3P
CN2203
CN2204
PROCESS C.B.A.
CN2201
CN2205
5P
CN2202
12P
CN2206
16P
RECORDER -KEY C.B.A.
CN001
FLEX. 14P
SYSCON-SERVO C.B.A.
CN601
FLEX. 11P
CN602
CN604
FLEX. 13P
CN612
FLEX. 11P
CN611
CN411
FLEX. 15P
CN431
4P
FG
DRUM MOTOR
DEW
CN401
CN610
4P
CN609
2P
CN608
2P
CN606
2P
CN607
2P
LOADING MOTOR
CN605
FLEX. 28P
CN107
FLEX. 13P
CN101
16P
CN2704
DIGITAL MEMORY C.B.A.
FLEX. 16P
CN2703
CN2701
2P
CN2702
2P
LITHIUM BATTERY
8P
CN105
5P
CN104
VIDEO C.B.A.
AGC C.B.A.
VIDEO C.B.A. CN111
AGC C.B.A. CN382
VIDEO C.B.A. CN110
AGC C.B.A. CN381
VIDEO C.B.A. CN108
JOG C.B.A. CN362
JOG C.B.A.
VIDEO C.B.A. CN109
JOG C.B.A. CN361
CN102
2P
CN302
4P
FOR SERVICE
CN103
3P
MIC JACK C.B.A.
CN061
3P

SYSCON–SERVO C.B.A.

CN401	
1	U
2	V
3	COM
4	W
CN411	
1	GND
2	SS5V
3	C–FG 2
4	C–FG 1
5	W
6	U
7	GND
8	V+
9	V–
10	H+
11	U+
12	U–
13	V
14	W+
15	W–
CN431	
1	D–FG
2	D–PG
3	COM
4	GND
CN601	
1	SS5V
2	MP Ⓗ / ME Ⓛ
3	HiMP Ⓛ
4	SAFETY TAB Ⓗ
5	TAPE SENS. LED
6	SS5V
7	BOT SENS. Ⓗ
8	SS5V
9	T–REEL FG
10	SS5V
11	T–REEL LED (–)
CN602	
1	TALLY
2	EVER 5V
3	EJECT SW Ⓛ
4	GND
5	R–KEY
6	POWER LED
7	SS5V
8	TRIGGER SW Ⓛ
9	SEL
10	– SW Ⓗ
11	TITLE/DATE SW Ⓗ
12	+ SW H
13	SHIFT SW Ⓗ
14	POWER SW Ⓛ
CN604	
1	S–REEL LED (–)
2	SS5V
3	S–REEL FG
4	MODE 3
5	MODE 2
6	MOED 1
7	GND
8	CASSETTE DOWN Ⓛ
9	SS5V
10	EOT SENS. Ⓗ
11	NC
12	SS5V
13	NC
CN605	
1	GND
2	EVF ON Ⓛ
3	CAMERA FADE
4	NC
5	JOG VD
6	CG–STROBE
7	VC–DATA
8	V–STROBE
9	CLOCK 1
10	NC
11	NC
12	SP Ⓗ /LP Ⓛ
13	PB Ⓗ /EE Ⓛ
14	C–SYNC
15	SS. AV ON Ⓛ
16	CAMERA Ⓗ /LINE Ⓛ
17	AUDIO FADE
18	NC
19	A–MUTE Ⓗ
20	NC
21	HEAD SW PULSE
22	JOG Ⓗ
23	PB ATF
24	SW PULSE 2
25	SW PULSE 1
26	RF PB Ⓗ
27	REC ATF
28	FE ON Ⓛ
CN606	
1	DEW Ⓗ
2	GND
CN607	
1	LOAD. MTR (+)
2	LORD. MTR (–)
CN608	
1	LITHIUM 3V
2	GND

SYSCON–SERVO C.B.A.

CN609	
1	UNREG 6V
2	GND
CN610	
1	TRIG. SW Ⓛ
2	TELE Ⓗ
3	WIDE Ⓗ
4	BATT.
CN611	
1	WIDE Ⓗ
2	TELE Ⓗ
3	CAMERA–CS Ⓛ
4	K–DATA
5	K–DATA
6	CLOCK 2
7	GND
8	REMOCON ON Ⓛ
9	CAMERA ON Ⓛ
10	RESET Ⓛ
11	EVER 5V
CN612	
1	SS5V
2	REMOCON DATA
3	GND
4	TALLY

RECORDER–KEY C.B.A.

CN001	
1	POWER SW Ⓛ
2	SHIFT SW Ⓗ
3	+ SW Ⓛ
4	TITLE/DATE SW Ⓗ
5	– SW Ⓗ
6	SEL
7	TRIG. SW Ⓛ
8	SS5V
9	POWER LED
10	R–KEY
11	GND
12	EJECT SW Ⓛ
13	EVER 5V
14	TALLY

AGC C.B.A.

CN381	
1	GND
2	AV 5V
3	DOC
4	V–DATA
5	CLOCK 1
6	V–STROBE
7	VC–DATA
8	AGC IN
9	REC VIDEO
CN382	
1	LINE IN
2	CHARACTOR
3	CAMERA Ⓗ /LINE Ⓛ
4	EVF VIDEO
5	JOG OUT
6	PB VIDEO
7	AGC OUT
8	VIDEO INV
9	AV 5V

JOG C.B.A.

CN361	
1	NC
2	SC
3	PB Ⓗ /EE Ⓛ
4	JOG Ⓗ
5	C OUT
6	JOG PHASE CONT.
CN362	
1	GND
2	C–SYNC
3	D.O.P.
4	1/2FH
5	C IN
6	AV 5V

REMOTE CONTROL C.B.A.

CW041	
1	SS5V
2	REMOCON DATA
3	GND
4	TALLY

MIC JACK C.B.A.

CW061	
1	MIC
2	BIAS
3	GND

VIDEO C.B.A.

CN101	
1	GND
2	FE HEAD
3	GND
4	GND
5	CH–1'
6	CH–1' REF
7	GND
8	CH–2
9	AV 5V
10	GND
11	AV 5V
12	CH–1
13	GND
CN102	
1	UNREG 6V
2	GND
CN103	
1	MIC
2	BIAS
3	GND
CN104	
1	CAMERA (C)
2	GND
3	CAMERA (Y)
4	GND
5	CAMERA FADE
CN105	
1	GND
2	CLOCK 1
3	VC–DATA
4	GND
5	CG–STROBE
6	CHARACTOR
7	EVF ON Ⓛ
8	EVF VIDEO
CN107	
1	FE ON Ⓛ
2	REC ATF
3	RF PB Ⓗ
4	SW PULSE 1
5	SW PULSE 2
6	PB ATF
7	JOG Ⓗ
8	HEAD SW PULSE
9	NC
10	A–MUTE Ⓗ
11	NC
12	FADE
13	CAMERA Ⓗ /LINE Ⓛ
14	SS. AV ON Ⓛ
15	C–SYNC
16	PB Ⓗ /EE Ⓛ
17	SP Ⓗ /LP Ⓛ
18	NC
19	NC
20	CLOCK 1
21	V–STROBE
22	VC–DATA
23	CG–STROBE
24	JOG VD
25	NC
26	CAMERA FADE
27	EVF ON Ⓛ
28	GND
CN108	
1	GND
2	C–SYNC
3	D.O.P.
4	1/2FH
5	C IN
6	AV 5V
CN109	
1	NC
2	SC
3	PB Ⓗ /EE Ⓛ
4	JOG Ⓗ
5	C OUT
6	JOG PHASE CONT.
CN110	
1	GND
2	AV 5V
3	DOC
4	V–DATA
5	CLOCK 1
6	V–STROBE
7	VC–DATA
8	AGC IN
9	REC VIDEO
CN111	
1	LINE IN
2	CHARACTOR
3	CAMERA Ⓗ /LINE Ⓛ
4	EVF VIDEO
5	JOG VD
6	PB VIDEO
7	AGC OUT
8	VIDEO INV
9	AV 5V
CN302	
1	CAMERA Ⓗ /LINE Ⓛ
2	AUDIO OUT
3	GND
4	AUDIO IN

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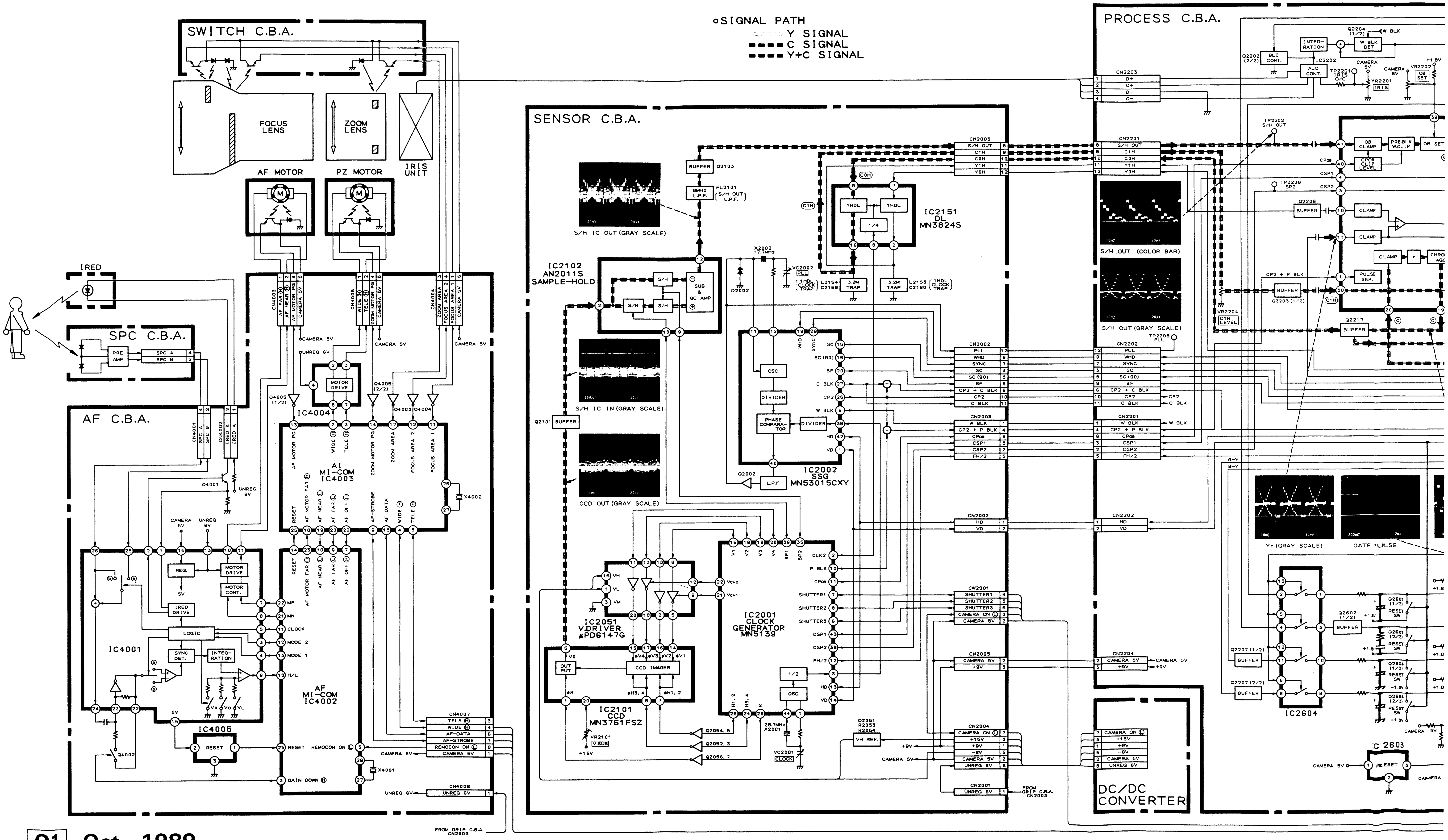
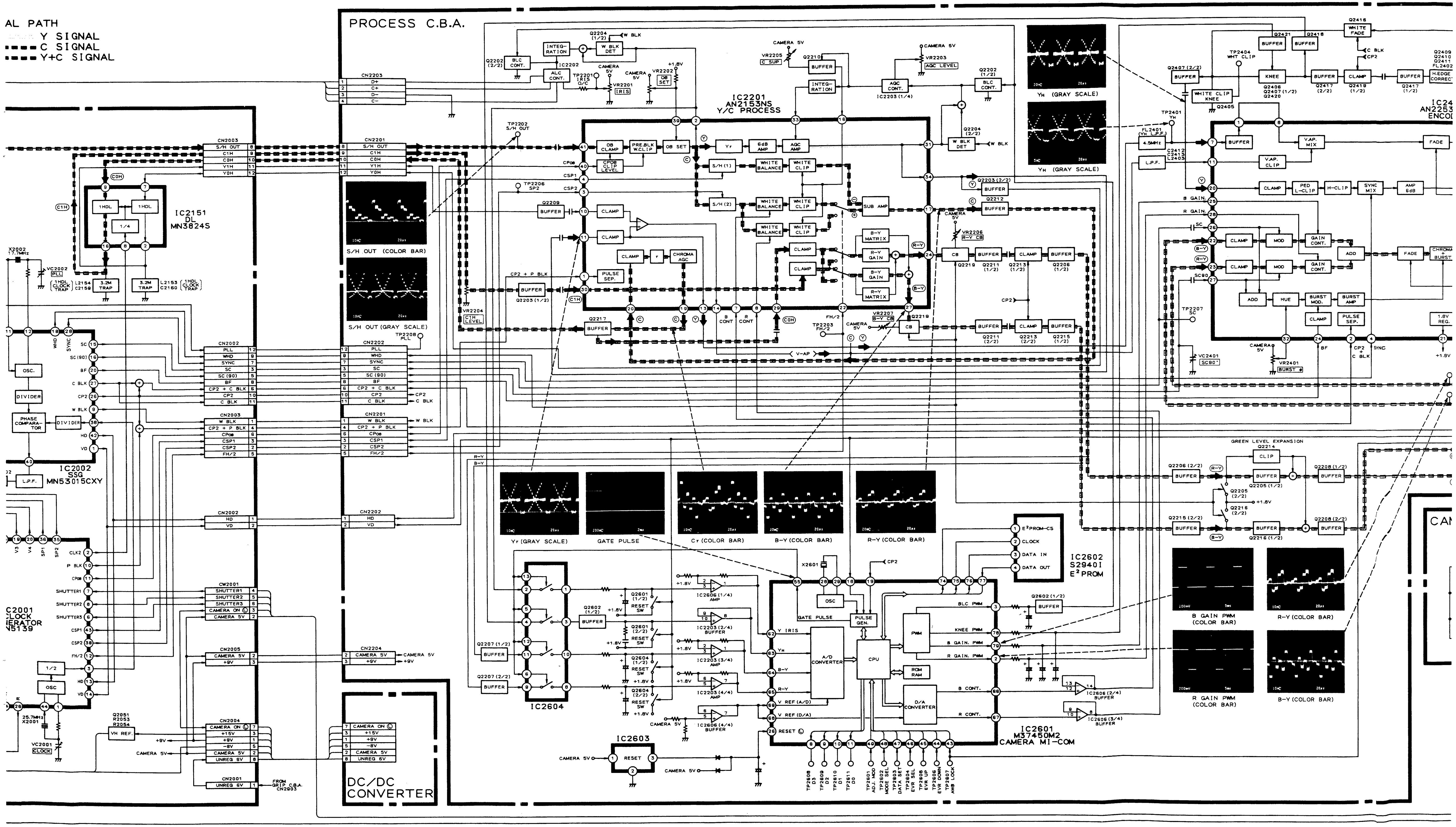
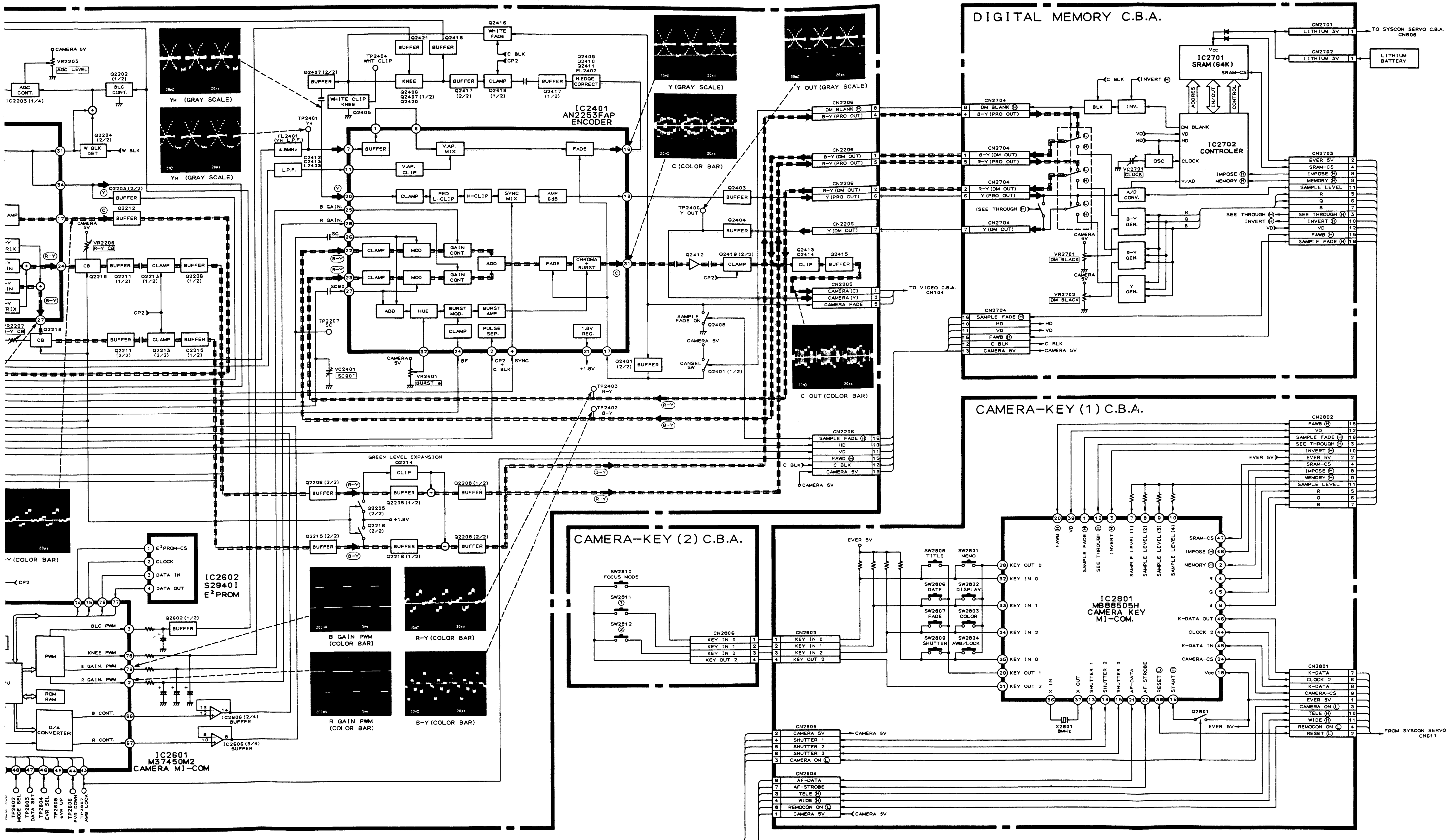
BLOCK DIAGRAM CAMERA SECTION



SIGNAL PATH
Y SIGNAL
C SIGNAL
Y+C SIGNAL
SWITCH C.B.A.
FOCUS LENS
ZOOM LENS
IRIS UNIT
AF MOTOR
PZ MOTOR
IRED
SPC C.B.A.
PRE AMP
SPC A
SPC B
AF C.B.A.
CN4001
CN4002
CN4003
CN4004
CN4005
CN4006
CN4007
IRED K
IRED A
AF MOTOR PG
CAMERA 5V
UNREG 6V
MOTOR DRIVE
Q4001
Q4005
Q4003
Q4004
IC4004
AI MI-COM IC4003
X4002
WIDE Ⓗ
TELE Ⓗ
ZOOM MOTOR PG
ZOOM AREA
FOCUS AREA 1
FOCUS AREA 2
RESET
AF MOTOR FAR Ⓗ
AF NEAR Ⓛ
AF FAR Ⓛ
AF OFF Ⓗ
AF-STROBE
AF-DATA
REG.
MOTOR CONT.
IRED DRIVE
LOGIC
SYNC DET.
INTEG-RATION
IC4001
IC4005
Q4002
MF
MN
CLOCK
MODE 2
MODE 1
H/L
AF MI-COM IC4002
REMOCON ON Ⓛ
GAIN DOWN Ⓗ
X4001
FROM GRIP C.B.A. CN2903
SENSOR C.B.A.
S/H IC OUT (GRAY SCALE)
S/H IC IN (GRAY SCALE)
CCD OUT (GRAY SCALE)
BUFFER Q2103
FL2101 (S/H OUT L.P.F.)
IC2102 AN2011S SAMPLE-HOLD
S/H
SUB & GC AMP
Q2101 BUFFER
X2002 17.7MHz
VC2002 PLL
D2002
L2154 C2159 (1HDL CLOCK TRAP)
L2153 C2160 (1HDL CLOCK TRAP)
3.2M TRAP
IC2151 DL MN3824S
1HDL
1/4
C1H
C0H
OSC.
DIVIDER
PHASE COMPARA-TOR
IC2002 SSG MN53015CXY
Q2002
L.P.F.
IC2051 V.DRIVER μPD6147G
IC2101 CCD MN3761FSZ
OUT PUT
CCD IMAGER
VR2101 V.SUB
IC2001 CLOCK GENERATOR MN5139
25.7MHz X2001
VC2001 CLOCK
Q2054, 5
Q2052, 3
Q2056, 7
Q2051 R2053 R2054
VH REF.
CN2003
CN2002
CN2004
CN2005
CN2001
CW2001
S/H OUT
C1H
C0H
Y1H
Y0H
PLL
WHD
SYNC
SC
SC (90)
BF
CP2 + C BLK
CP2
C BLK
W BLK
CP2 + P BLK
CPOB
CSP1
CSP2
FH/2
HD
VD
SHUTTER1
SHUTTER2
SHUTTER3
CAMERA ON Ⓛ
CAMERA 5V
+9V
+15V
-8V
UNREG 6V
FROM GRIP C.B.A. CN2903
PROCESS C.B.A.
CN2203
CN2201
CN2202
CN2204
D+
C+
D−
C−
TP2202 S/H OUT
TP2206 SP2
TP2208 PLL
TP2201 IRIS O/C
VR2201 IRIS
VR2202 OB SET
VR2204 C1H LEVEL
Q2202 (2/2)
BLC CONT.
INTEG-RATION
Q2204 (1/2)
W BLK DET
IC2202
ALC CONT.
OB CLAMP
PREBLK W.CLIP
OB SET
CPOB CLIP LEVEL
Q2209 BUFFER
CLAMP
PULSE SEP.
Q2203 (1/2)
Q2217 BUFFER
S/H OUT (COLOR BAR)
S/H OUT (GRAY SCALE)
Yr (GRAY SCALE)
GATE PULSE
R−Y
B−Y
IC2604
Q2207 (1/2) BUFFER
Q2207 (2/2) BUFFER
Q2602 (1/2) BUFFER
Q2601 (1/2) RESET SW
Q2601 (2/2) RESET SW
Q2604 (1/2) RESET SW
Q2604 (2/2) RESET SW
IC 2603
RESET
DC/DC CONVERTER

01 Oct. 1989


AL PATH
Y SIGNAL
C SIGNAL
Y+C SIGNAL
PROCESS C.B.A.
IC2201 AN2153NS Y/C PROCESS
IC2151 DL MN3824S
IC2002 SSG MN53015CXY
IC2001 CLOCK GENERATOR N5139
IC2604
IC2603
IC2602 S29401 E²PROM
IC2601 M37450M2 CAMERA MI-COM
IC24 AN2253 ENCOD
DC/DC CONVERTER
S/H OUT (COLOR BAR)
S/H OUT (GRAY SCALE)
YH (GRAY SCALE)
YH (GRAY SCALE)
Yr (GRAY SCALE)
GATE PULSE
Cr (COLOR BAR)
B-Y (COLOR BAR)
R-Y (COLOR BAR)
B GAIN PWM (COLOR BAR)
R-Y (COLOR BAR)
R GAIN PWM (COLOR BAR)
B-Y (COLOR BAR)
GREEN LEVEL EXPANSION
CN2203
CN2003
CN2201
CN2002
CN2202
CN2004
CN2005
CN2204
CN2001
CW2001
A/D CONVERTER
D/A CONVERTER
CPU
PWM
ROM RAM
PULSE GEN.
OSC
WHITE BALANCE
WHITE CLIP
SUB AMP
B-Y MATRIX
R-Y MATRIX
CHROMA AGC
CLAMP
BUFFER
KNEE
WHITE CLIP KNEE
WHITE FADE
H.EDGE CORRECT
V.AP. MIX
V.AP. CLIP
SYNC MIX
BURST MOD.
BURST AMP
PULSE SEP.
HUE
MOD
GAIN CONT.
FADE
CAN


DIGITAL MEMORY C.B.A.
CAMERA-KEY (1) C.B.A.
CAMERA-KEY (2) C.B.A.
IC2401 AN2253FAP ENCODER
IC2701 SRAM (64K)
IC2702 CONTROLER
IC2801 MB88505H CAMERA KEY MI-COM.
IC2601 M37450M2 CAMERA MI-COM
IC2602 S29401 E²PROM
YH (GRAY SCALE)
Y (GRAY SCALE)
Y OUT (GRAY SCALE)
C (COLOR BAR)
C OUT (COLOR BAR)
Y (COLOR BAR)
B GAIN PWM (COLOR BAR)
R-Y (COLOR BAR)
R GAIN PWM (COLOR BAR)
B-Y (COLOR BAR)
GREEN LEVEL EXPANSION
TO SYSCON SERVO C.B.A. CN608
LITHIUM BATTERY
TO VIDEO C.B.A. CN104
FROM SYSCON SERVO C.B.A. CN611
CN2701
CN2702
CN2703
CN2704
CN2205
CN2206
CN2801
CN2802
CN2803
CN2804
CN2805
CN2806
SW2810 FOCUS MODE
SW2805 TITLE
SW2801 MEMO
SW2806 DATE
SW2802 DISPLAY
SW2807 FADE
SW2803 COLOR
SW2808 SHUTTER
SW2804 AWB/LOCK
X2801 8MHz
VR2203 AGC LEVEL
VR2206 R-Y CB
VR2401 BURST φ
VC2401 SC90°
VR2701 DM BLACK
VR2702 DM BLACK
VC2701 CLOCK
CAMERA 5V
EVER 5V

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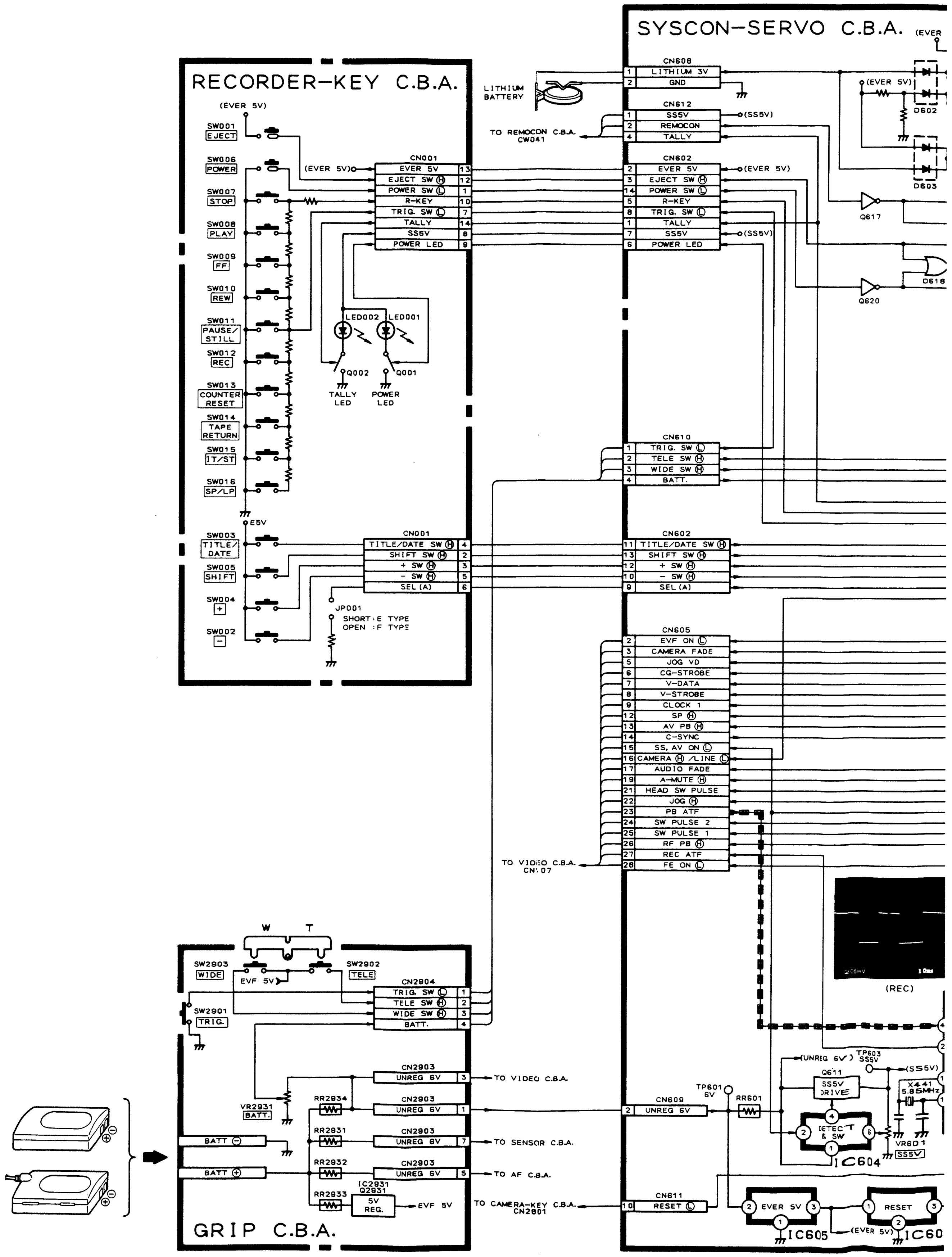
Ⅳ-2

BLOCK DIAGRAM SYSCON-SERVO SECTION


SYSCON−SERVO C.B.A.
RECORDER−KEY C.B.A.
(EVER 5V)
SW001 EJECT
SW006 POWER
SW007 STOP
SW008 PLAY
SW009 FF
SW010 REW
SW011 PAUSE/STILL
SW012 REC
SW013 COUNTER RESET
SW014 TAPE RETURN
SW015 IT/ST
SW016 SP/LP
E5V
SW003 TITLE/DATE
SW005 SHIFT
SW004 +
SW002 −
CN001
EVER 5V
EJECT SW Ⓗ
POWER SW Ⓛ
R-KEY
TRIG. SW Ⓛ
TALLY
SS5V
POWER LED
LED002
LED001
Q002
Q001
TALLY LED
POWER LED
TITLE/DATE SW Ⓗ
SHIFT SW Ⓗ
+ SW Ⓗ
− SW Ⓗ
SEL (A)
JP001
SHORT : E TYPE
OPEN : F TYPE
LITHIUM BATTERY
TO REMOCON C.B.A. CW041
CN608
LITHIUM 3V
GND
CN612
SS5V
REMOCON
TALLY
(SS5V)
CN602
(EVER 5V)
D602
D603
Q617
Q618
Q620
CN610
TRIG. SW Ⓛ
TELE SW Ⓗ
WIDE SW Ⓗ
BATT.
CN605
EVF ON Ⓛ
CAMERA FADE
JOG VD
CG-STROBE
V-DATA
V-STROBE
CLOCK 1
SP Ⓗ
AV PB Ⓗ
C-SYNC
SS. AV ON Ⓛ
CAMERA Ⓗ /LINE Ⓛ
AUDIO FADE
A-MUTE Ⓗ
HEAD SW PULSE
JOG Ⓗ
PB ATF
SW PULSE 2
SW PULSE 1
RF PB Ⓗ
REC ATF
FE ON Ⓛ
TO VIDEO C.B.A. CN107
(REC)
W
T
SW2903 WIDE
SW2902 TELE
EVF 5V
SW2901 TRIG.
CN2904
TRIG. SW Ⓛ
TELE SW Ⓗ
WIDE SW Ⓗ
BATT.
CN2903
UNREG 6V
TO VIDEO C.B.A.
TO SENSOR C.B.A.
TO AF C.B.A.
VR2931 BATT.
RR2934
RR2931
RR2932
RR2933
BATT ⊖
BATT ⊕
IC2931 Q2931
5V REG.
EVF 5V
GRIP C.B.A.
TO CAMERA-KEY C.B.A. CN2801
CN609
UNREG 6V
TP601 6V
RR601
(UNREG 6V)
TP603 SS5V
Q611
SS5V DRIVE
DETECT & SW
IC604
X441 5.85MHz
VR601 SS5V
CN611
RESET Ⓛ
EVER 5V
RESET
IC605
(EVER 5V)

01 Oct. 1989
Ⅳ−3

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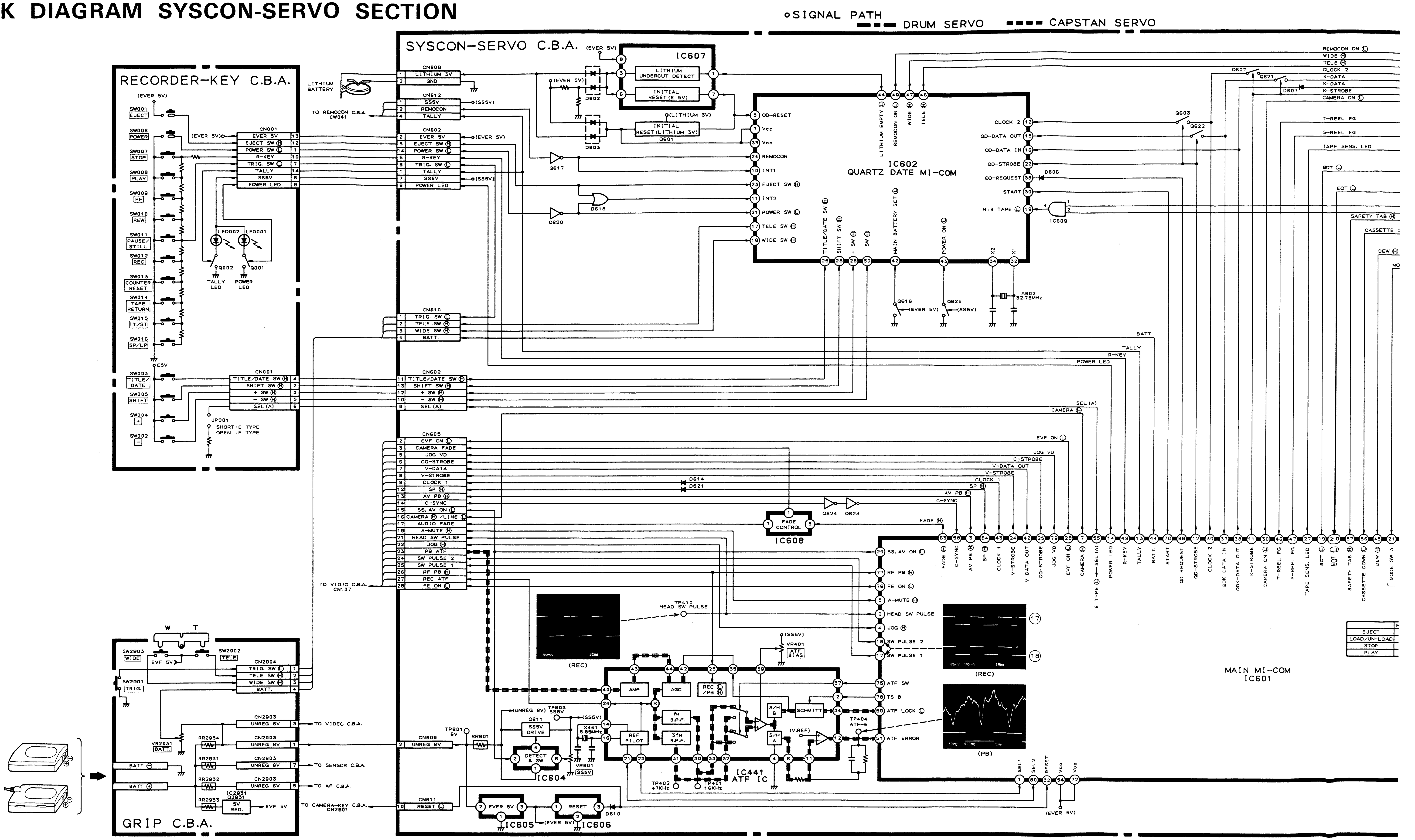
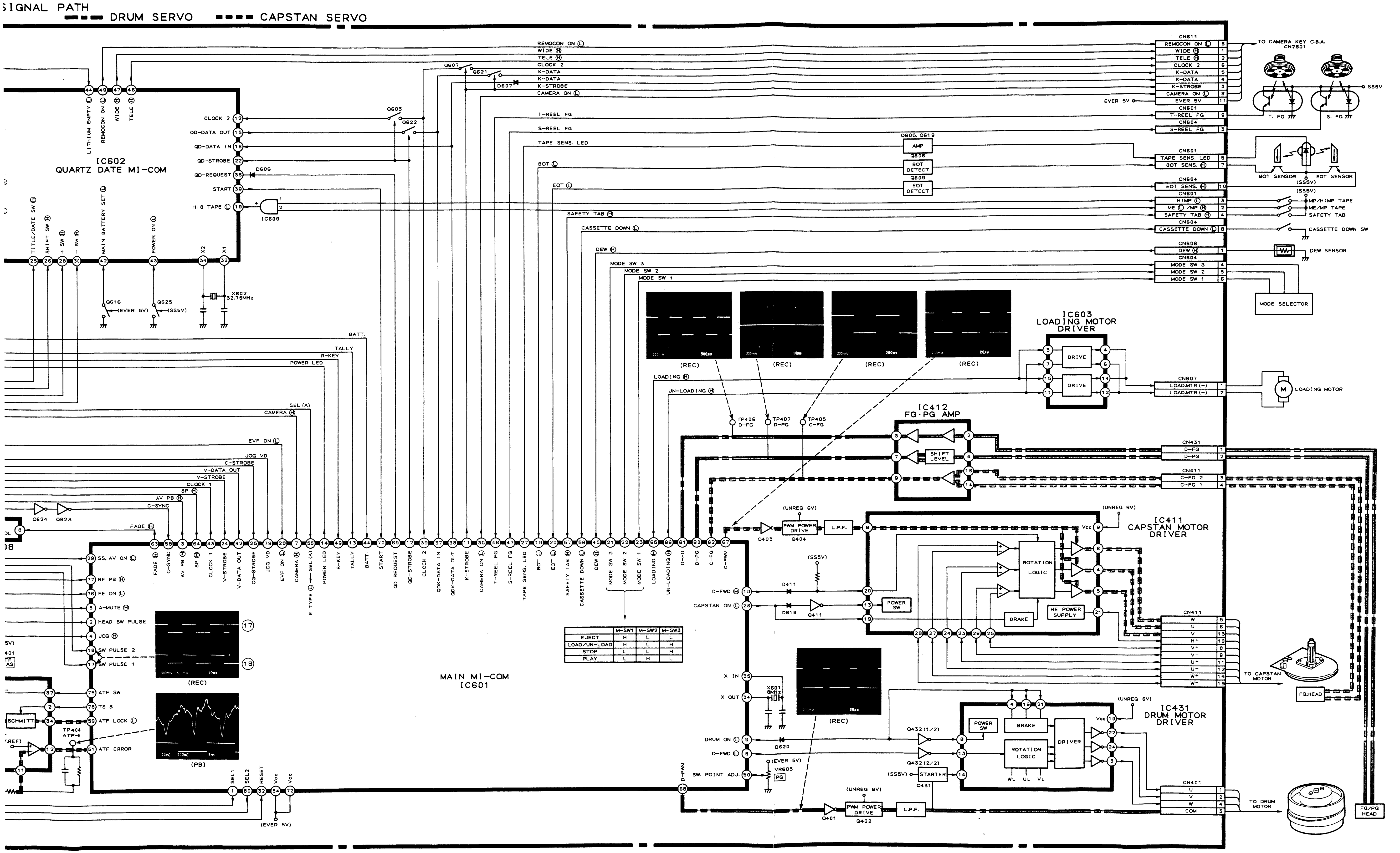
LOCK DIAGRAM SYSCON-SERVO SECTION


○SIGNAL PATH
DRUM SERVO
CAPSTAN SERVO
SYSCON-SERVO C.B.A.
RECORDER-KEY C.B.A.
GRIP C.B.A.
IC607
LITHIUM UNDERCUT DETECT
INITIAL RESET(E 5V)
INITIAL RESET(LITHIUM 3V)
Q601
D602
D603
LITHIUM BATTERY
TO REMOCON C.B.A. CW041
CN608
CN612
CN602
CN610
CN605
CN609
CN611
CN001
Q617
Q620
D618
IC602
QUARTZ DATE MI-COM
QD-RESET
REMOCON
INT1
EJECT SW Ⓗ
INT2
POWER SW Ⓛ
TELE SW Ⓗ
WIDE SW Ⓗ
CLOCK 2
QD-DATA OUT
QD-DATA IN
QD-STROBE
QD-REQUEST
START
Hi8 TAPE Ⓛ
IC609
X602 32.768MHz
Q616
Q625
Q603
Q622
Q607
Q621
D606
D607
SW001 EJECT
SW006 POWER
SW007 STOP
SW008 PLAY
SW009 FF
SW010 REW
SW011 PAUSE/STILL
SW012 REC
SW013 COUNTER RESET
SW014 TAPE RETURN
SW015 IT/ST
SW016 SP/LP
SW003 TITLE/DATE
SW005 SHIFT
SW004 +
SW002 −
LED002
LED001
Q002
Q001
TALLY LED
POWER LED
JP001
SHORT : E TYPE
OPEN : F TYPE
TO VIDEO C.B.A. CN:07
IC608
FADE CONTROL
Q624
Q623
D614
D621
TP410 HEAD SW PULSE
(REC)
(PB)
IC441
ATF IC
AMP
AGC
REC Ⓛ /PB Ⓗ
fH B.P.F.
3fH B.P.F.
REF PILOT
S/H B
S/H A
SCHMITT
VR401 ATF BIAS
TP404 ATF-E
TP402 47KHz
TP401 16KHz
Q611
SS5V DRIVE
DETECT & SW
IC604
X441 5.85MHz
VR601 SS5V
TP601 6V
RR601
TP603 SS5V
IC605
EVER 5V
IC606
RESET
D610
MAIN MI-COM
IC601
SS. AV ON Ⓛ
RF PB Ⓗ
FE ON Ⓛ
A-MUTE Ⓗ
HEAD SW PULSE
JOG Ⓗ
SW PULSE 2
SW PULSE 1
ATF SW
TS B
ATF LOCK Ⓛ
ATF ERROR
SW2903 WIDE
SW2902 TELE
SW2901 TRIG.
CN2904
CN2903
VR2931 BATT.
RR2934
RR2931
RR2932
RR2933
IC2931 Q2931 5V REG.
EVF 5V
TO VIDEO C.B.A.
TO SENSOR C.B.A.
TO AF C.B.A.
TO CAMERA-KEY C.B.A. CN2801
BATT ⊖
BATT ⊕
EJECT
LOAD/UN-LOAD
STOP
PLAY
(17)
(18)


SIGNAL PATH
DRUM SERVO
CAPSTAN SERVO
IC602
QUARTZ DATE MI-COM
LITHIUM EMPTY Ⓛ
REMOCON ON Ⓛ
WIDE Ⓗ
TELE Ⓗ
CLOCK 2
QD-DATA OUT
QD-DATA IN
QD-STROBE
QD-REQUEST
START
Hi8 TAPE Ⓛ
IC609
D606
TITLE/DATE SW Ⓗ
SHIFT SW Ⓗ
+ SW Ⓗ
– SW Ⓗ
MAIN BATTERY SET Ⓗ
POWER ON Ⓛ
X2
X1
Q616
(EVER 5V)
Q625
(SS5V)
X602
32.768MHz
Q603
Q622
Q607
Q621
D607
K-DATA
K-STROBE
CAMERA ON Ⓛ
T-REEL FG
S-REEL FG
TAPE SENS. LED
BOT Ⓛ
EOT Ⓛ
SAFETY TAB Ⓗ
CASSETTE DOWN Ⓛ
DEW Ⓗ
MODE SW 3
MODE SW 2
MODE SW 1
Q605, Q619
AMP
Q606
BOT DETECT
Q609
EOT DETECT
CN611
TO CAMERA KEY C.B.A. CN2801
EVER 5V
CN601
CN604
CN606
CN607
SS5V
T. FG
S. FG
BOT SENSOR
EOT SENSOR
(SS5V)
HIMP Ⓛ
ME Ⓛ /MP Ⓗ
MP/HiMP TAPE
ME/MP TAPE
SAFETY TAB
CASSETTE DOWN SW
DEW SENSOR
MODE SELECTOR
IC603
LOADING MOTOR DRIVER
DRIVE
LOADING Ⓗ
UN-LOADING Ⓗ
LOAD.MTR (+)
LOAD.MTR (–)
LOADING MOTOR
(REC)
TP406 D-FG
TP407 D-PG
TP405 C-FG
IC412
FG·PG AMP
SHIFT LEVEL
CN431
D-FG
D-PG
CN411
C-FG 2
C-FG 1
BATT.
TALLY
R-KEY
POWER LED
SEL (A)
CAMERA Ⓗ
EVF ON Ⓛ
JOG VD
C-STROBE
V-DATA OUT
V-STROBE
CLOCK 1
SP Ⓗ
AV PB Ⓗ
C-SYNC
Q624
Q623
FADE Ⓗ
SS. AV ON Ⓛ
RF PB Ⓗ
FE ON Ⓛ
A-MUTE Ⓗ
HEAD SW PULSE
JOG Ⓗ
SW PULSE 2
SW PULSE 1
ATF SW
TS 8
ATF LOCK Ⓛ
ATF ERROR
SCHMITT
TP404 ATF-E
(PB)
E TYPE Ⓛ
QDK-DATA IN
QDK-DATA OUT
D-PG
C-FG
C-PWM
MAIN MI-COM
IC601
(UNREG 6V)
PWM POWER DRIVE
Q403
Q404
L.P.F.
IC411
CAPSTAN MOTOR DRIVER
Vcc
ROTATION LOGIC
(SS5V)
C-FWD Ⓗ
CAPSTAN ON Ⓛ
D411
D619
Q411
POWER SW
BRAKE
HE POWER SUPPLY
TO CAPSTAN MOTOR
FG.HEAD
X IN
X OUT
X601
8MHz
DRUM ON Ⓛ
D-FWD Ⓛ
D620
Q432 (1/2)
Q432 (2/2)
(EVER 5V)
VR603
PG
SW. POINT ADJ.
STARTER
Q431
IC431
DRUM MOTOR DRIVER
DRIVER
WL UL VL
CN401
COM
TO DRUM MOTOR
FG/PG HEAD
D-PWM
Q401
Q402
SEL1
SEL2
RESET
Vcc

	M-SW1	M-SW2	M-SW3
EJECT	H	L	L
LOAD/UN-LOAD	H	L	H
STOP	L	L	H
PLAY	L	H	L

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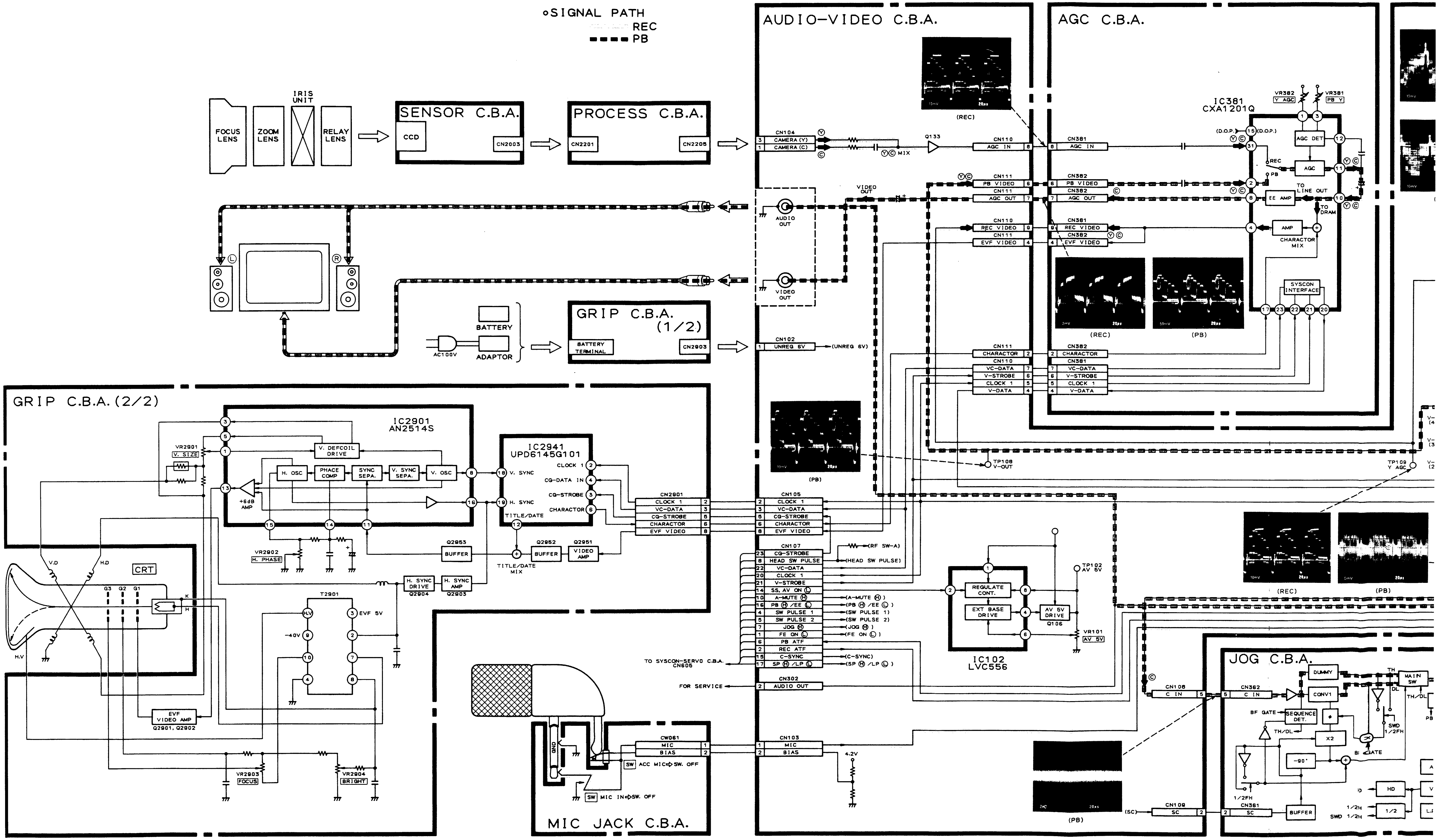
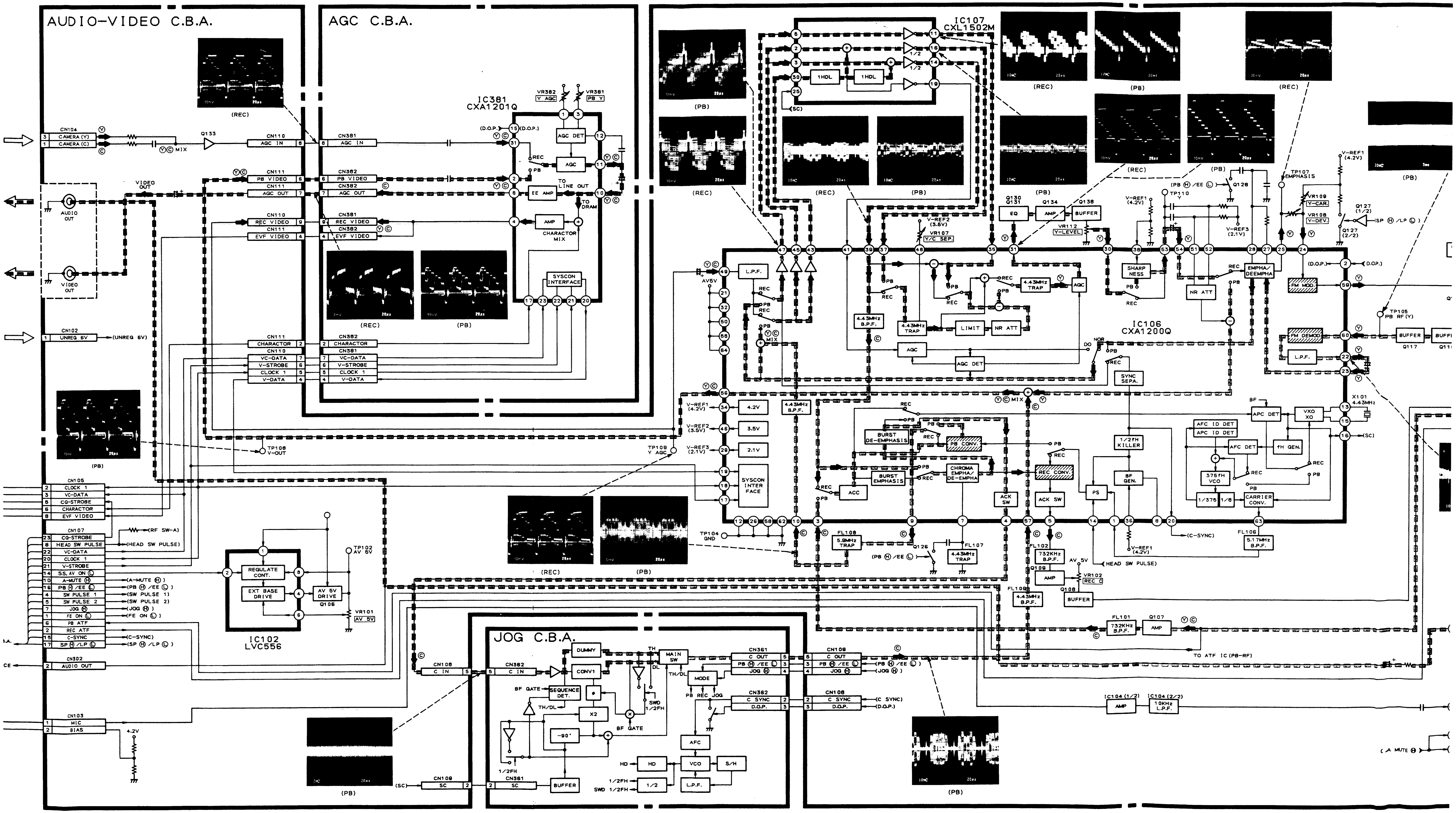
BLOCK DIAGRAM AUDIO-VIDEO SECTION



SIGNAL PATH
REC
PB
FOCUS LENS
ZOOM LENS
IRIS UNIT
RELAY LENS
SENSOR C.B.A.
CCD
CN2003
PROCESS C.B.A.
CN2201
CN2205
BATTERY
AC100V
ADAPTOR
GRIP C.B.A. (1/2)
BATTERY TERMINAL
CN2903
AUDIO-VIDEO C.B.A.
CN104
CAMERA (Y)
CAMERA (C)
MIX
Q133
CN110
AGC IN
CN111
PB VIDEO
AGC OUT
REC VIDEO
EVF VIDEO
AUDIO OUT
VIDEO OUT
CN102
UNREG 6V
(UNREG 6V)
CHARACTOR
VC-DATA
V-STROBE
CLOCK 1
V-DATA
(REC)
(PB)
TP108
V-OUT
AGC C.B.A.
IC381
CXA1201Q
VR382
Y AGC
VR381
PB Y
CN381
CN382
AGC DET
AGC
EE AMP
AMP
TO LINE OUT
TO DRAM
CHARACTOR MIX
SYSCON INTERFACE
TP109
Y AGC
GRIP C.B.A. (2/2)
IC2901
AN2514S
VR2901
V. SIZE
V. DEFCOIL DRIVE
H. OSC
PHACE COMP
SYNC SEPA.
V. SYNC SEPA.
V. OSC
+6dB AMP
VR2902
H. PHASE
IC2941
UPD6145G101
V. SYNC
H. SYNC
CLOCK 1
CG-DATA IN
CG-STROBE
CHARACTOR
TITLE/DATE
TITLE/DATE MIX
Q2953
BUFFER
Q2952
BUFFER
Q2951
VIDEO AMP
CN2901
CG-STROBE
EVF VIDEO
CRT
V.D
H.D
G3 G2 G1
K
H
H.V
H. SYNC DRIVE
Q2904
H. SYNC AMP
Q2903
T2901
EVF 5V
-40V
EVF VIDEO AMP
Q2901, Q2902
VR2903
FOCUS
VR2904
BRIGHT
CN105
CN107
HEAD SW PULSE
SS. AV ON
A-MUTE
PB /EE
SW PULSE 1
SW PULSE 2
JOG
FE ON
PB ATF
REC ATF
C-SYNC
SP /LP
(RF SW-A)
(HEAD SW PULSE)
TO SYSCON-SERVO C.B.A. CN606
FOR SERVICE
CN302
AUDIO OUT
REGULATE CONT.
EXT BASE DRIVE
AV 5V DRIVE
Q106
TP102
AV 5V
VR101
AV 5V
IC102
LVC556
MIC JACK C.B.A.
GND
CW061
MIC
BIAS
SW ACC MIC⇒SW. OFF
SW MIC IN⇒SW. OFF
CN103
4.2V
JOG C.B.A.
CN106
C IN
CN362
DUMMY
CONV1
MAIN SW
BF GATE
SEQUENCE DET.
TH/DL
X2
-90°
BF GATE
SWD 1/2FH
1/2FH
CN109
SC
CN361
BUFFER
HD
1/2
1/2H
SWD 1/2H



AUDIO-VIDEO C.B.A.
AGC C.B.A.
JOG C.B.A.
IC381 CXA1201Q
IC107 CXL1502M
IC106 CXA1200Q
IC102 LVC556
CN104
CAMERA (Y)
CAMERA (C)
Q133
Y C MIX
CN110
AGC IN
CN381
CN111
PB VIDEO
AGC OUT
REC VIDEO
EVF VIDEO
CN382
VR382 Y AGC
VR381 PB Y
AGC DET
AGC
EE AMP
AMP
TO LINE OUT
TO DRAM
CHARACTOR MIX
SYSCON INTERFACE
AUDIO OUT
VIDEO OUT
CN102
UNREG 6V
(UNREG 6V)
CHARACTOR
VC-DATA
V-STROBE
CLOCK 1
V-DATA
TP108 V-OUT
TP109 Y AGC
CN105
CLOCK 1
VC-DATA
CG-STROBE
CHARACTOR
EVF VIDEO
CN107
CG-STROBE
HEAD SW PULSE
VC-DATA
CLOCK 1
V-STROBE
SS.AV ON L
A-MUTE H
PB H /EE L
SW PULSE 1
SW PULSE 2
JOG H
FE ON L
PB ATF
REC ATF
C-SYNC
SP H /LP L
(RF SW-A)
(HEAD SW PULSE)
(A-MUTE H)
(PB H /EE L)
(SW PULSE 1)
(SW PULSE 2)
(JOG H)
(FE ON L)
(C-SYNC)
(SP H /LP L)
CN302
AUDIO OUT
CN103
MIC
BIAS
4.2V
REGULATE CONT.
EXT BASE DRIVE
AV 5V DRIVE
Q106
TP102 AV 5V
VR101 AV 5V
1HDL
1/2
(SC)
L.P.F.
AV5V
4.43MHz B.P.F.
4.43MHz TRAP
LIMIT
NR ATT
AGC DET
SYNC SEPA.
EQ
AMP
BUFFER
Q130 Q131
Q134
Q136
VR112 Y-LEVEL
VR107 Y/C SEP.
V-REF2 (3.5V)
V-REF1 (4.2V)
V-REF3 (2.1V)
TP110 Y
SHARP NESS
EMPHA/ DEEMPHA
TP107 EMPHASIS
VR109 Y-CAR.
VR108 Y-DEV.
Q127 (1/2)
Q127 (2/2)
Q128
(SP H /LP L)
(PB H /EE L)
FM DEMOD
FM MOD.
(D.O.P.)
TP105 PB RF (Y)
BUFFER
Q117
Y C MIX
4.2V
3.5V
2.1V
SYSCON INTER FACE
BURST DE-EMPHASIS
PB CONV.
BURST EMPHASIS
CHROMA EMPHA/ DE-EMPHA
ACC
ACK SW
REC CONV.
1/2fH KILLER
PS
BF GEN.
APC DET
VXO XO
X101 4.43MHz
AFC ID DET
APC ID DET
AFC DET
fH GEN.
375fH VCO
1/375
1/8
CARRIER CONV.
FL106 5.17MHz B.P.F.
TP104 GND
FL108 5.9MHz TRAP
FL107 4.43MHz TRAP
Q126
(PB H /EE L)
FL102 732KHz B.P.F.
Q109 AMP
VR102 REC C
Q108 BUFFER
FL109 4.43MHz B.P.F.
FL101 732KHz B.P.F.
Q107 AMP
HEAD SW PULSE
(C-SYNC)
TO ATF IC (PB-RF)
IC104 (1/2) AMP
IC104 (2/2) 10KHz L.P.F.
(A MUTE H)
CN108
C IN
CN382
C IN
DUMMY
CONV1
MAIN SW
MODE
SEQUENCE DET.
BF GATE
TH/DL
X2
-90°
1/2FH
SWD 1/2FH
AFC
HD
VCO
S/H
1/2
L.P.F.
BUFFER
CN109
CN361
SC
(SC)
C OUT
PB H /EE L
JOG H
CN362
C SYNC
D.O.P.
(C SYNC)
(D.O.P.)
(JOG H)
(REC)
(PB)

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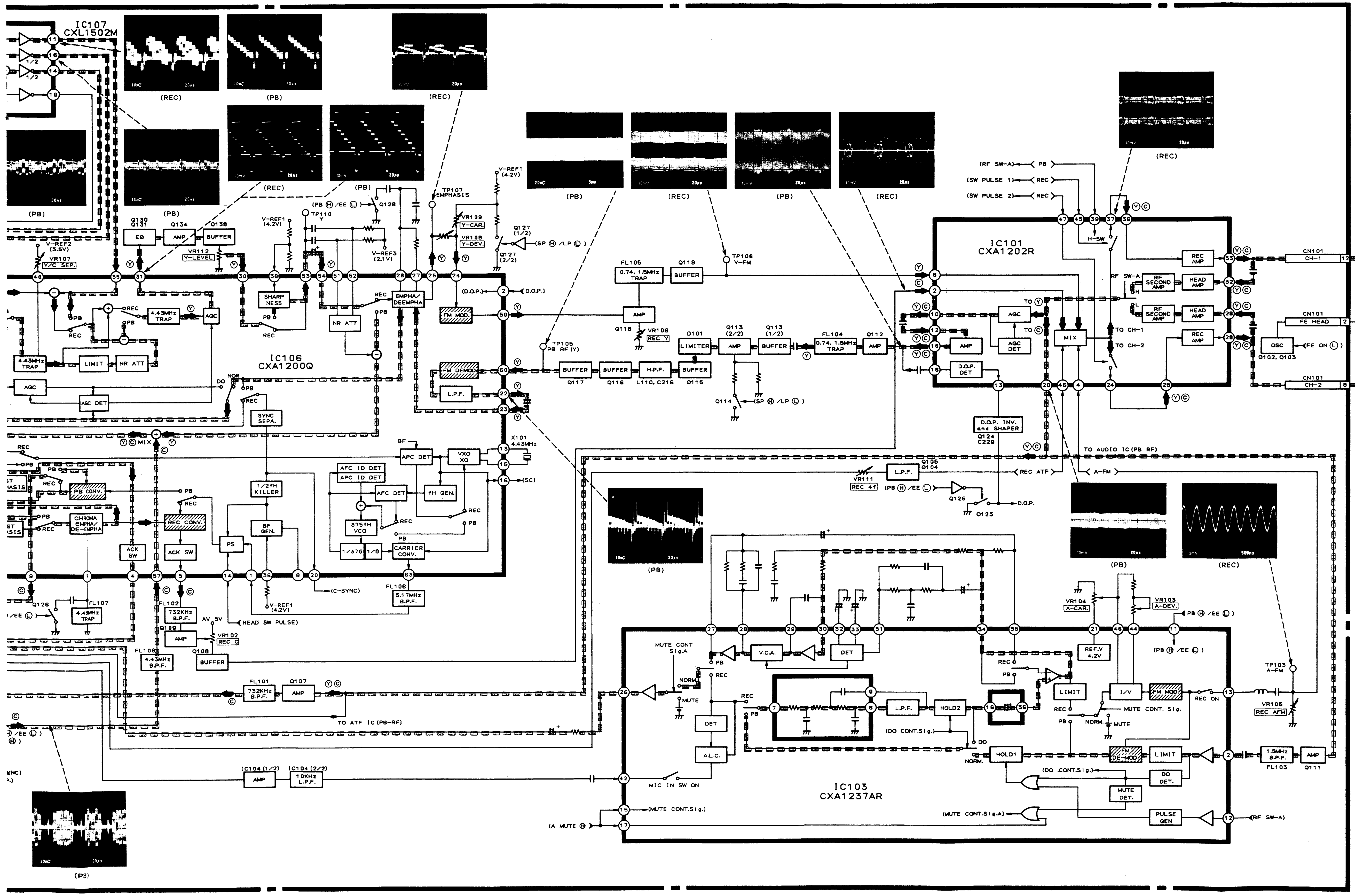
IC107
CXL1502M
IC106
CXA1200Q
IC101
CXA1202R
IC103
CXA1237AR
DRUM MOTOR
CH-1 HEAD
FE HEAD
CH-2 HEAD
CN101 CH-1
CN101 FE HEAD
CN101 CH-2
(REC)
(PB)
TP107 EMPHASIS
TP110 Y
TP106 Y-FM
TP105 PB RF (Y)
TP103 A-FM
VR107 Y/C SEP.
VR112 Y-LEVEL
VR109 Y-CAR.
VR108 Y-DEV.
VR106 REC Y
VR111 REC 4f
VR104 A-CAR.
VR103 A-DEV.
VR105 REC AFM
VR102 REC C
FL105 0.74, 1.5MHz TRAP
FL104 0.74, 1.5MHz TRAP
FL107 4.43MHz TRAP
FL102 732KHz B.P.F.
FL101 732KHz B.P.F.
FL109 4.43MHz B.P.F.
FL106 5.17MHz B.P.F.
FL103 1.5MHz B.P.F.
X101 4.43MHz
EQ
AMP
BUFFER
SHARP NESS
NR ATT
EMPHA/ DEEMPHA
FM MOD.
FM DEMOD
L.P.F.
H.P.F.
LIMITER
AGC
AGC DET
LIMIT
4.43MHz TRAP
SYNC SEPA.
APC DET
VXO XO
AFC ID DET
AFC DET
fH GEN.
375fH VCO
1/375
1/8
CARRIER CONV.
1/2fH KILLER
BF GEN.
PS
PB CONV.
REC CONV.
CHROMA EMPHA/ DE-EMPHA
ACK SW
REC AMP
RF SECOND AMP
HEAD AMP
MIX
D.O.P. DET
D.O.P. INV. and SHAPER
OSC
V.C.A.
DET
A.L.C.
HOLD1
HOLD2
REF.V 4.2V
I/V
FM MOD
FM DE-MOD
DO DET.
MUTE DET.
PULSE GEN
TO AUDIO IC (PB RF)
TO ATF IC (PB-RF)
(C-SYNC)
HEAD SW PULSE
MIC IN SW ON
(MUTE CONT.Sig.)
(A MUTE ⊖)
(RF SW-A)
(SW PULSE 1)
(SW PULSE 2)
(FE ON Ⓛ)
(SP Ⓗ / LP Ⓛ)
(PB Ⓗ / EE Ⓛ)
(D.O.P.)
REC ATF
A-FM
IC104 (1/2) AMP
IC104 (2/2) 10KHz L.P.F.

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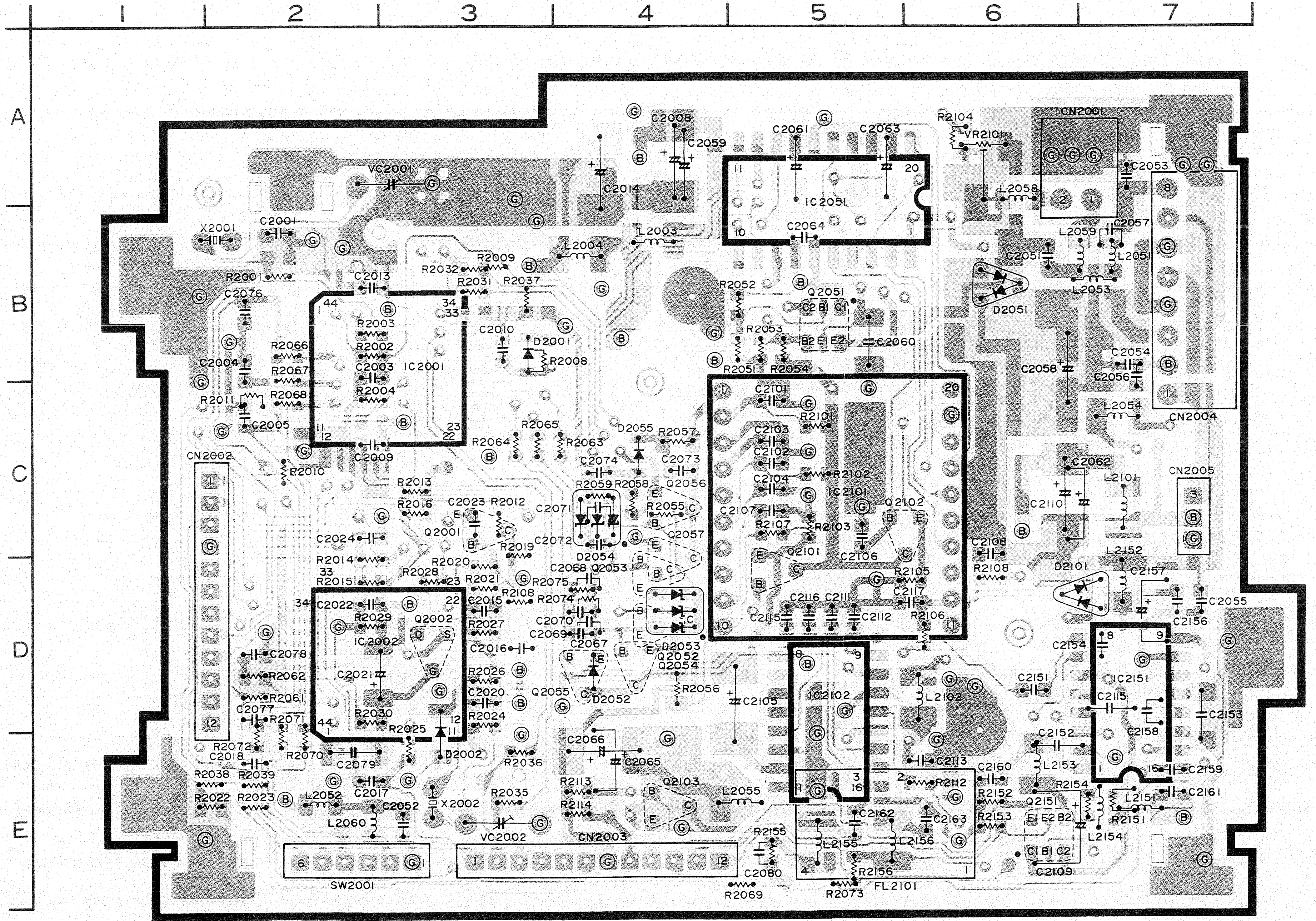
CIRCUIT BOARD DIAGRAM SENSOR・GRIP C.B.A.

< NOTICE >
Process C. B. A. consists of four layers.
(Soldering, Component, Ground and Camera 5V patterns.)
※ Through-hole marks on each C. B. A. denote :
○ : Soldering side ⟷ Component side
Ⓖ : Soldering side (Component side) ⟷ Ground
Ⓑ : Soldering side (Component side) ⟷ Camera 5V

SENSOR C.B.A.

D2001	B−3
D2002	E−3
D2051	B−6
D2052	D−4
D2053	D−4
D2054	C−4
D2055	C−4
D2101	D−6
IC2001	B−3
IC2002	D−3
IC2051	A−5
IC2101	C−5
IC2102	D−5
IC2151	D−7
Q2001	C−3
Q2002	D−3
Q2051	B−5
Q2052	D−4
Q2053	D−4
Q2054	D−4
Q2055	D−4
Q2056	C−4
Q2057	D−4
Q2101	D−5
Q2102	C−6
Q2103	E−4
Q2151	E−6


1
2
3
4
5
6
7
A
B
C
D
E
CN2001
CN2002
CN2003
CN2004
CN2005
SW2001
VC2001
VC2002
X2001
X2002
VR2101
FL2101
IC2001
IC2002
IC2051
IC2101
IC2102
IC2151
D2001
D2002
D2051
D2052
D2053
D2054
D2055
D2101
Q2001
Q2002
Q2051
Q2052
Q2053
Q2054
Q2055
Q2056
Q2057
Q2101
Q2102
Q2103
Q2151
L2003
L2004
L2051
L2052
L2053
L2054
L2055
L2058
L2059
L2060
L2101
L2102
L2151
L2152
L2153
L2154
L2155
L2156
C2001
C2003
C2004
C2005
C2008
C2009
C2010
C2013
C2014
C2015
C2016
C2017
C2018
C2020
C2021
C2022
C2023
C2024
C2051
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C2079
C2080
C2101
C2102
C2103
C2104
C2105
C2106
C2107
C2108
C2109
C2110
C2111
C2112
C2113
C2115
C2116
C2117
C2151
C2152
C2153
C2154
C2156
C2157
C2158
C2159
C2160
C2161
C2162
C2163
R2001
R2002
R2003
R2004
R2008
R2009
R2010
R2011
R2012
R2013
R2014
R2015
R2016
R2019
R2020
R2021
R2022
R2023
R2024
R2025
R2026
R2027
R2028
R2029
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R2032
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R2036
R2037
R2038
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R2061
R2062
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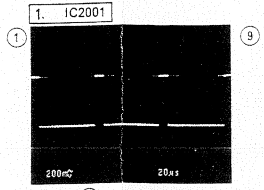
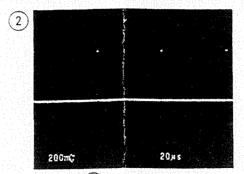
R2064
R2065
R2066
R2067
R2068
R2069
R2070
R2071
R2072
R2073
R2074
R2075
R2101
R2102
R2103
R2104
R2105
R2106
R2107
R2108
R2112
R2113
R2114
R2151
R2152
R2153
R2154
R2155
R2156
B2 E1 E2
C2 B1 C1
E1 E2 B2
C1 B1 C2
1
2
3
8
9
10
11
12
16
20
22
23
33
34
44
Ⓖ
Ⓑ

SIGNAL WAVEFORMS

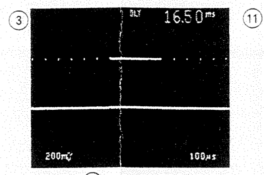
1. IC2001

①


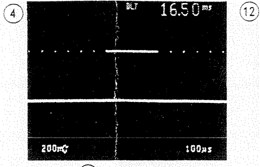
1−1 ⑩ PIN

②


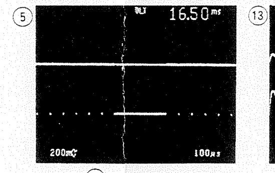
1−2 ⑪ PIN

③


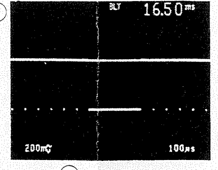
1−3 ⑮ PIN

④


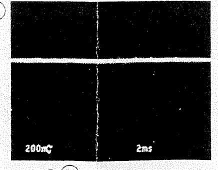
1−4 ⑯ PIN

⑤


1−5 ⑲ PIN

⑥


1−6 ⑳ PIN

⑦


1−7 ㉑ PIN

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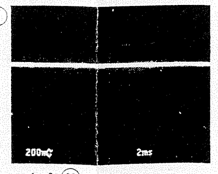
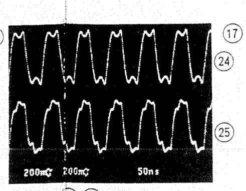
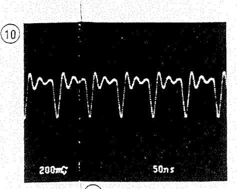


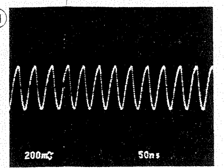
1−8 ㉒ PIN

⑨


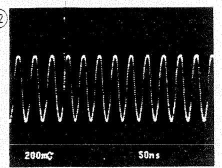
1−9 ㉔㉕ PIN

⑩


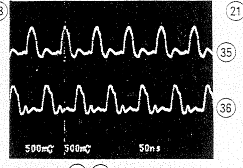
1−10 ㉖ PIN

⑪


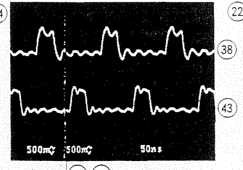
1−11 ㉗ PIN

⑫


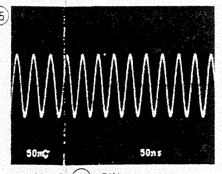
1−12 ㉘ PIN

⑬


1−13 ㉟㊱ PIN

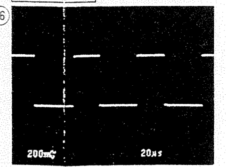
⑭


1−14 ㊳㊸ PIN

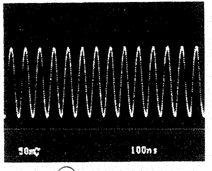
⑮


1−15 ㊹ PIN

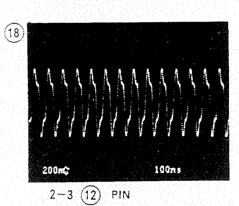
2. IC2002

⑯


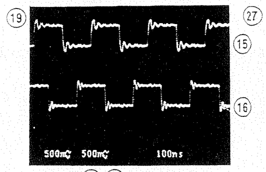
2−1 ⑨ PIN

⑰


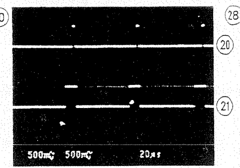
2−2 ⑪ PIN

⑱


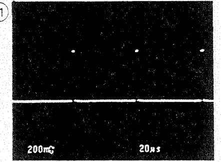
2−3 ⑫ PIN

⑲


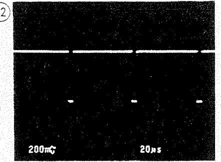
2−4 ⑮⑯ PIN

⑳


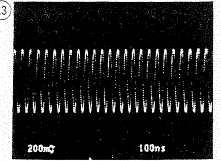
2−5 ⑳㉑ PIN

㉑


2−6 ㉖ PIN

㉒


2−7 ㉘ PIN

㉓


2−8 ㊳ PIN

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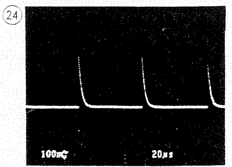
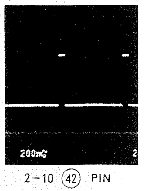
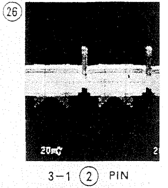


2−9 ㊵ PIN

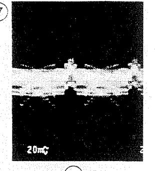
㉕


2−10 ㊷ PIN

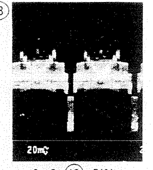
3. IC2102

㉖


3−1 ② PIN

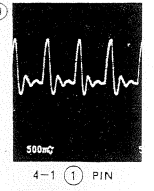
㉗


3−2 ④ PIN

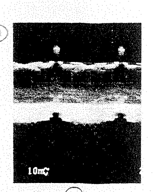
㉘


3−3 ⑫ PIN

4. IC2101

㉙


4−1 ① PIN

㉚


4−2 ⑤ PIN

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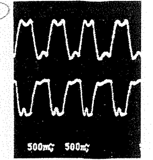
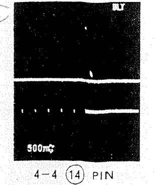
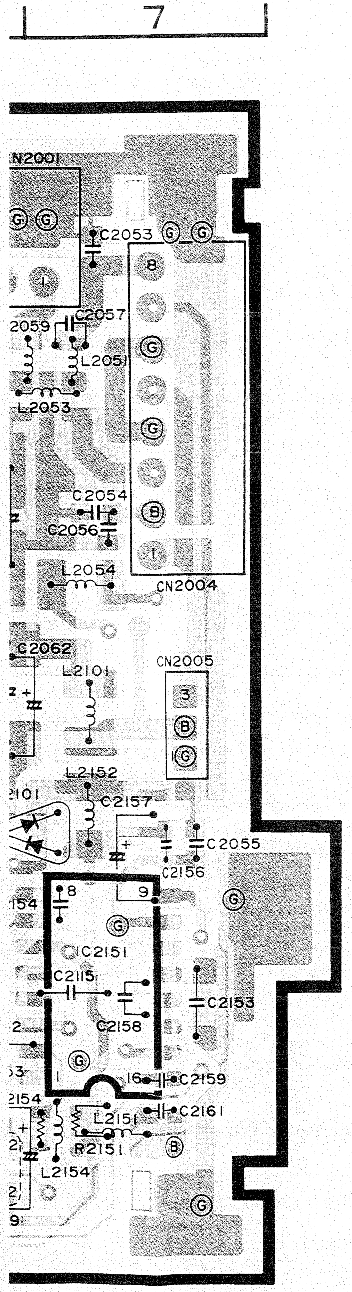


4−3 ⑧⑦ PIN

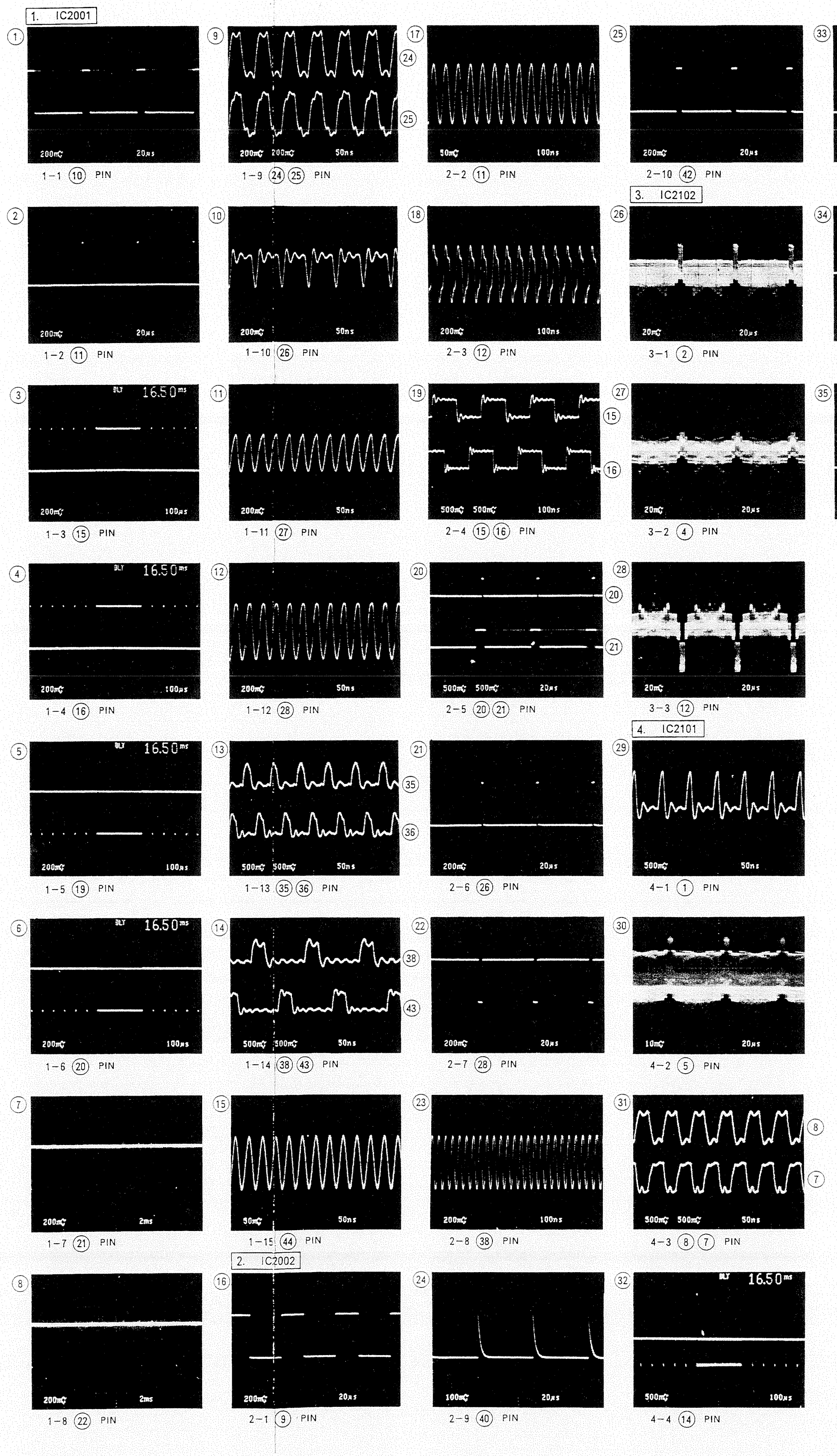
㉜


4−4 ⑭ PIN

01 Oct. 1989

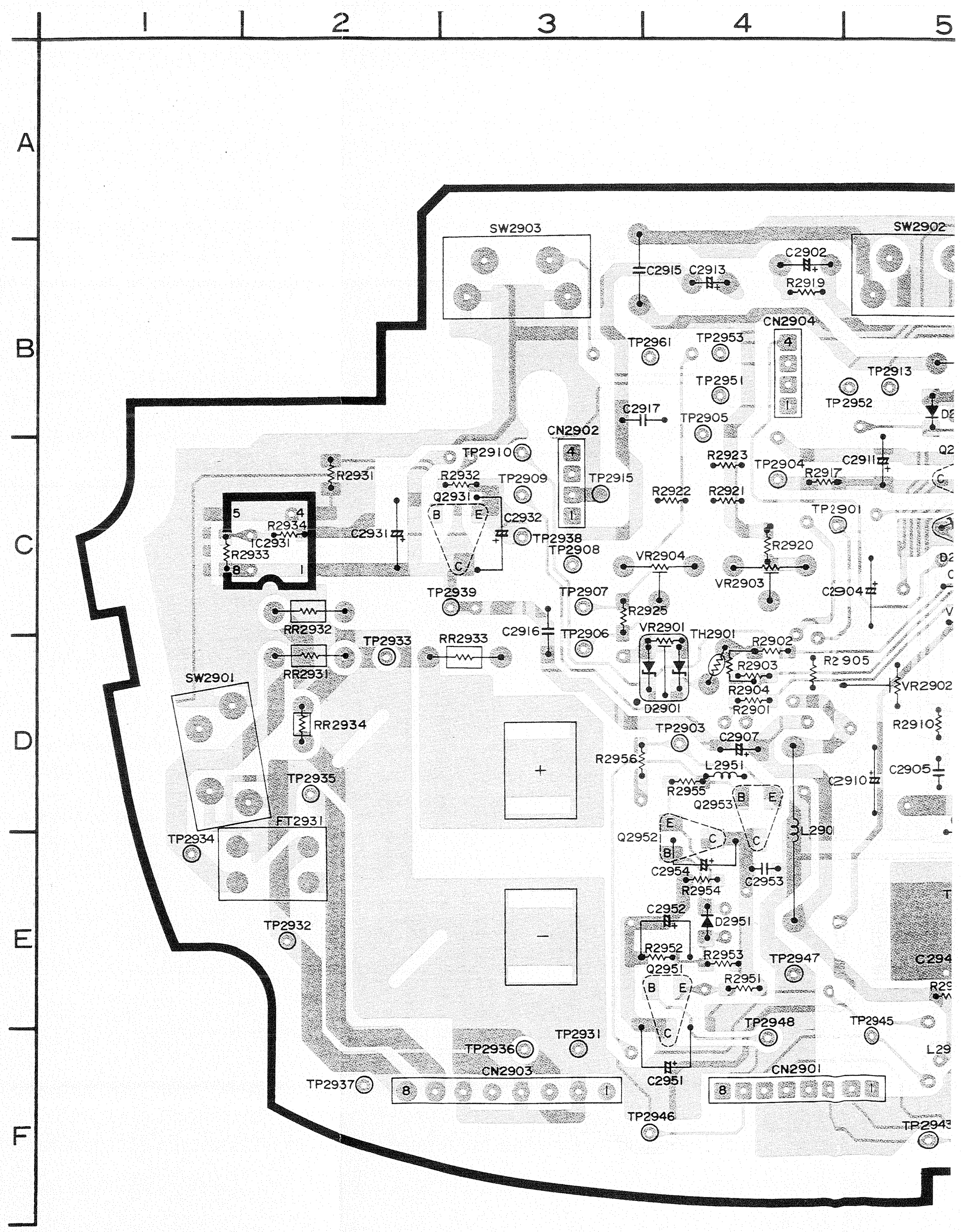

7
CN2001
C2053
C2057
2059
L2051
L2053
C2054
C2056
L2054
CN2004
C2062
L2101
CN2005
L2152
C2157
C2055
C2156
IC2151
C2115
C2153
C2158
C2159
C2161
L2151
R2151
L2154

SIGNAL WAVEFORMS



GRIP C.B.A.

D2901	D-4
D2902	D-7
D2903	B-5
D2904	B-6
D2905	B-5
D2951	E-4
D2961	C-5
IC2901	C-6
IC2931	C-2
IC2941	E-6
Q2901	C-7
Q2902	B-7
Q2903	C-5
Q2904	B-5
Q2931	C-3
Q2951	E-4
Q2952	D-4
Q2953	D-4


1
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A
B
C
D
E
F
SW2903
SW2902
C2915
C2913
C2902
R2919
CN2904
TP2961
TP2953
TP2951
TP2913
TP2952
C2917
TP2905
CN2902
TP2910
R2931
R2932
TP2909
TP2915
R2923
TP2904
R2917
C2911
Q2931
R2922
R2921
TP2901
R2934
IC2931
R2933
C2931
C2932
TP2938
TP2908
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VR2903
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TP2907
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R2925
RR2932
TP2933
RR2933
C2916
TP2906
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TH2901
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R2903
R2905
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R2901
VR2902
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TP2932
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R2951
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TP2945
TP2936
TP2931
CN2903
CN2901
C2951
TP2937
TP2946
TP2943

GRIP C.B.A.

D2901	D-4
D2902	D-7
D2903	B-5
D2904	B-6
D2905	B-5
D2951	E-4
D2961	C-5
IC2901	C-6
IC2931	C-2
IC2941	E-6
Q2901	C-7
Q2902	B-7
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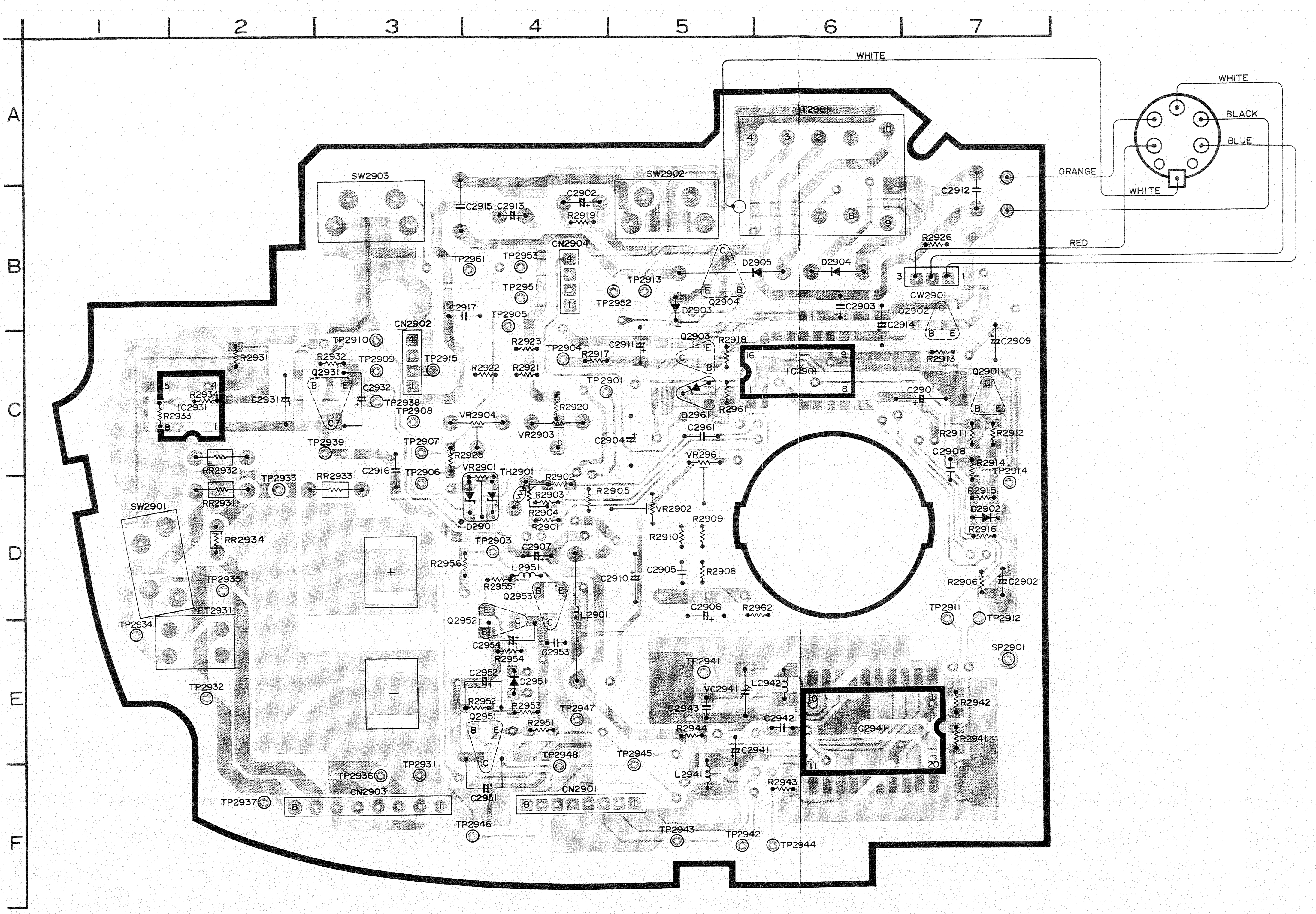
Q2904	B-5
Q2931	C-3
Q2951	E-4
Q2952	D-4
Q2953	D-4



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WHITE
ORANGE
BLACK
BLUE
RED
T2901
SW2903
SW2902
SW2901
CN2904
CN2902
CN2903
CN2901
CW2901
IC2901
IC2931
IC2941
Q2901
Q2902
Q2903
Q2904
Q2931
Q2951
Q2952
Q2953
D2901
D2902
D2903
D2904
D2905
D2951
D2961
VR2901
VR2902
VR2903
VR2904
VR2961
VC2941
TH2901
L2901
L2941
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L2951
FT2931
SP2901
C2901
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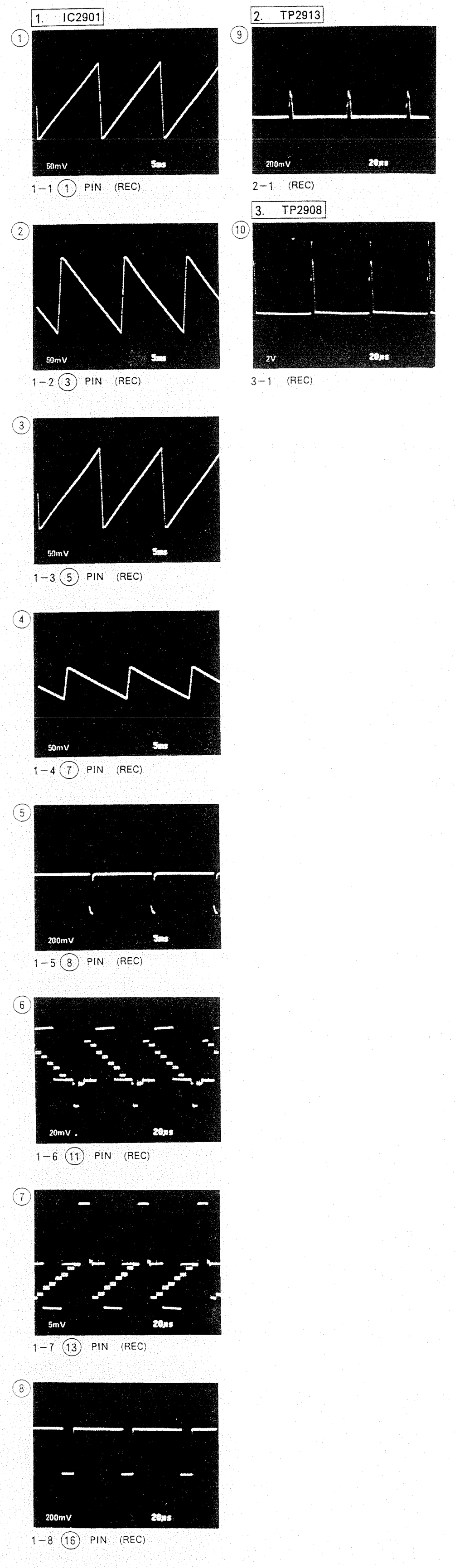
TP2937
TP2938
TP2939
TP2941
TP2942
TP2943
TP2944
TP2945
TP2946
TP2947
TP2948
TP2951
TP2952
TP2953
TP2961
+
−

SIGNAL WAVEFORMS



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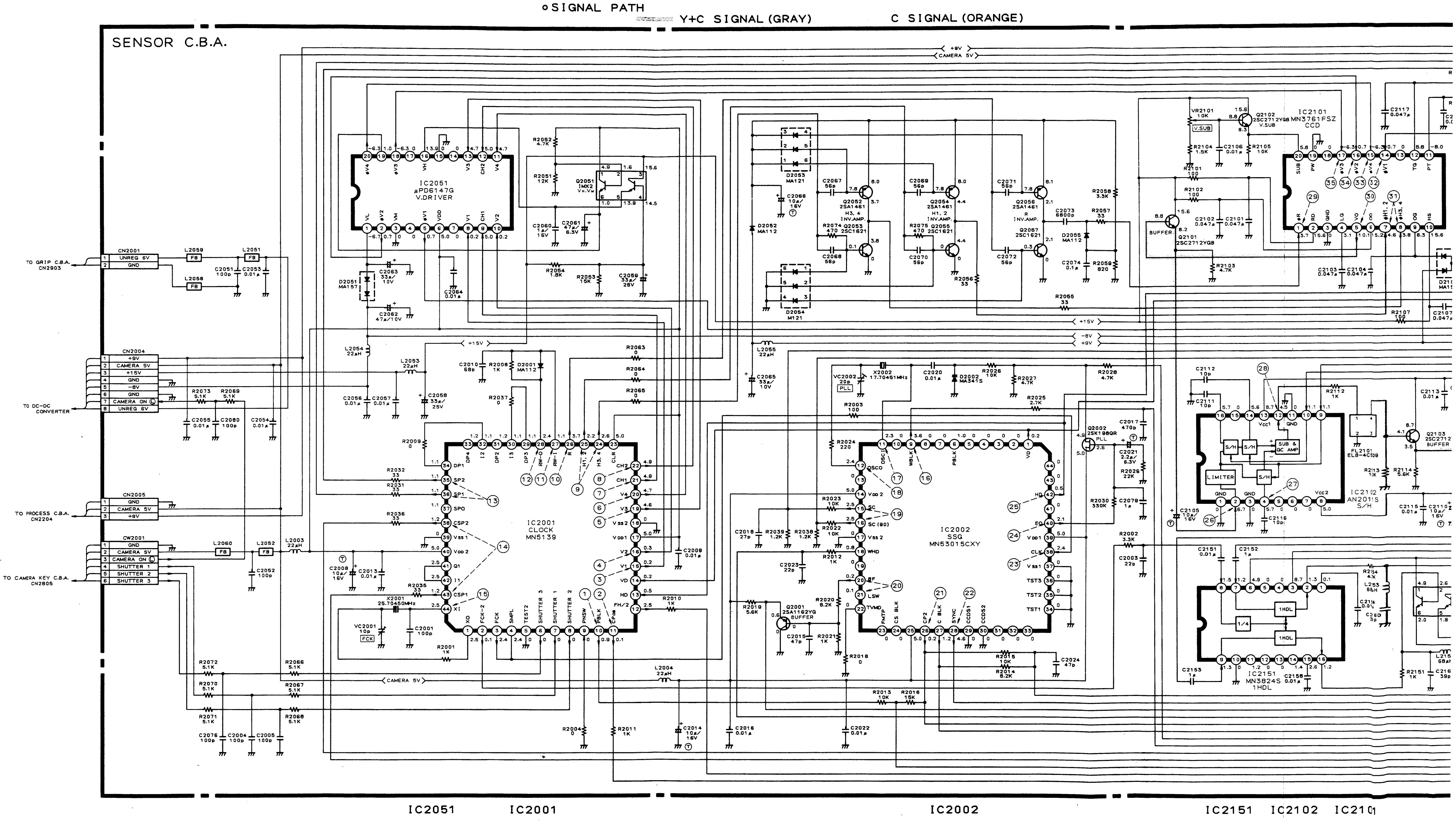
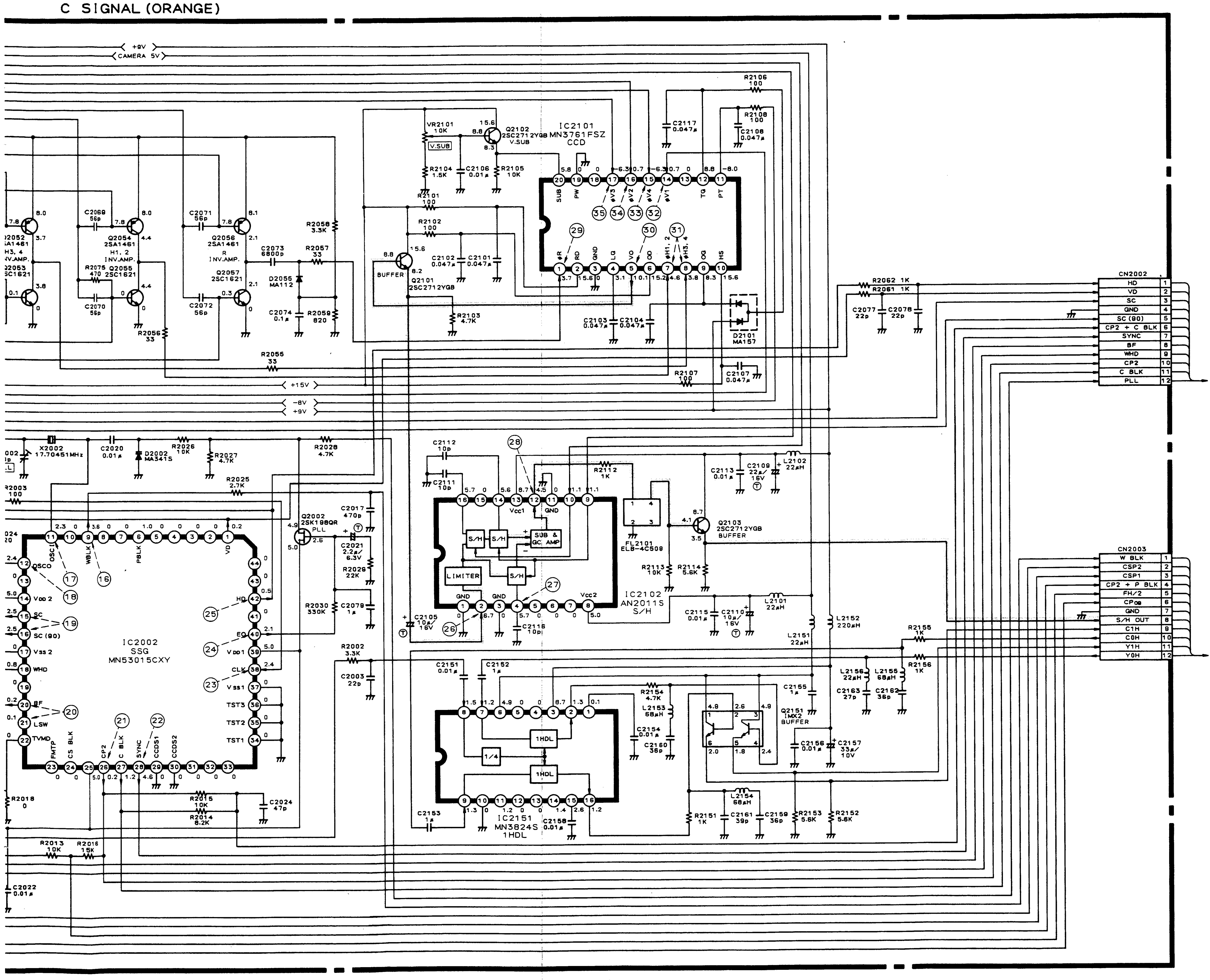
SCHEMATIC DIAGRAM SENSOR · GRIP C.B.A.



○SIGNAL PATH
Y+C SIGNAL (GRAY)
C SIGNAL (ORANGE)
SENSOR C.B.A.
TO GRIP C.B.A. CN2903
CN2001
UNREG 6V
GND
TO DC-DC CONVERTER
CN2004
+9V
CAMERA 5V
+15V
GND
-8V
GND
CAMERA ON
UNREG 6V
TO PROCESS C.B.A. CN2204
CN2005
GND
CAMERA 5V
+8V
TO CAMERA KEY C.B.A. CN2805
CW2001
GND
CAMERA 5V
CAMERA ON
SHUTTER 1
SHUTTER 2
SHUTTER 3
IC2051
μPD6147G
V.DRIVER
IC2001
CLOCK
MN5139
X2001
25.70450MHz
IC2002
SSG
MN53015CXY
X2002
17.70451MHz
Q2001
2SA1162YG
BUFFER
Q2002
2SK198GR
PLL
Q2051
IMX2
Q2052
2SA1461
H3, 4
INV.AMP.
Q2053
2SC1621
Q2054
2SA1461
H1, 2
INV.AMP.
Q2055
2SC1621
Q2056
2SA1461
R
INV.AMP.
Q2057
2SC1621
IC2101
MN3761FSZ
CCD
Q2101
2SC2712YGB
BUFFER
Q2102
2SC2712YGB
V.SUB
Q2103
2SC2712
BUFFER
IC2102
AN2011S
S/H
LIMITER
SUB & GC AMP
FL2101
ELB-4C109
IC2151
MN3824S
1HDL
+15V
-8V
+9V
CAMERA 5V
IC2051
IC2001
IC2002
IC2151
IC2102
IC2101

01 Oct. 1989

C SIGNAL (ORANGE)

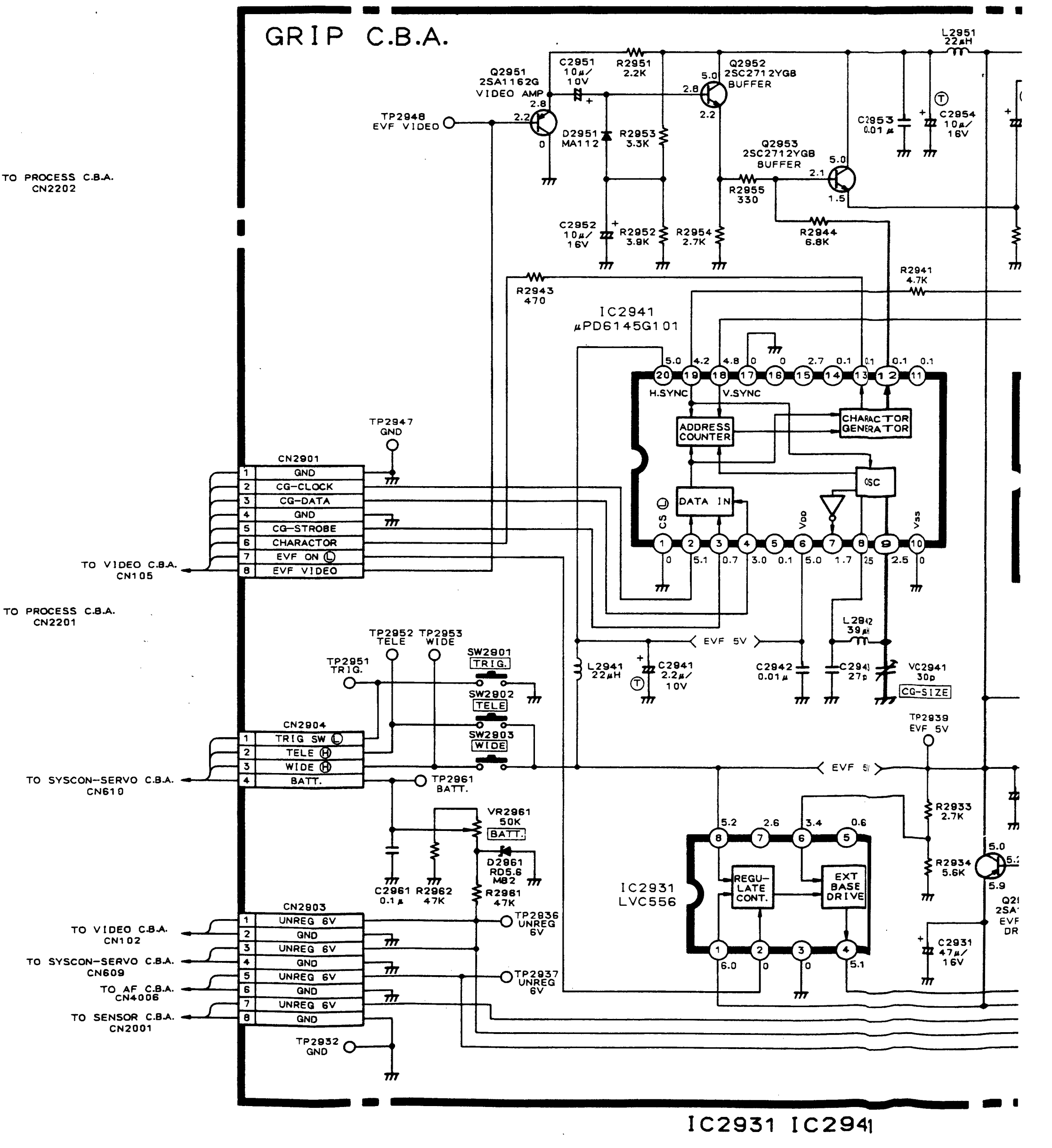


+9V
CAMERA 5V
+15V
-8V
+9V
IC2101 MN3761FSZ CCD
Q2102 2SC2712YGB V.SUB
VR2101 10K
V.SUB
Q2101 2SC2712YGB BUFFER
D2101 MA157
Q2052 2SA1461
Q2054 2SA1461 H1, 2 INV.AMP.
Q2055 2SC1621
Q2056 2SA1461 R INV.AMP.
Q2057 2SC1621
D2055 MA112
X2002 17.70451MHz
D2002 MA341S
Q2002 2SK198QR PLL
IC2002 SSG MN53015CXY
IC2102 AN2011S S/H
LIMITER
S/H
SUB & GC AMP
FL2101 ELB-4C508
Q2103 2SC2712YGB BUFFER
IC2151 MN3824S 1HDL
1HDL
1/4
Q2151 IMX2 BUFFER
CN2002
HD
VD
SC
GND
SC (80)
CP2 + C BLK
SYNC
BF
WHD
CP2
C BLK
PLL
TO PROCESS C.B.A. CN2202
CN2003
W BLK
CSP2
CSP1
CP2 + P BLK
FH/2
CPOB
GND
S/H OUT
C1H
C0H
Y1H
Y0H
TO PROCESS C.B.A. CN2201

IC2002

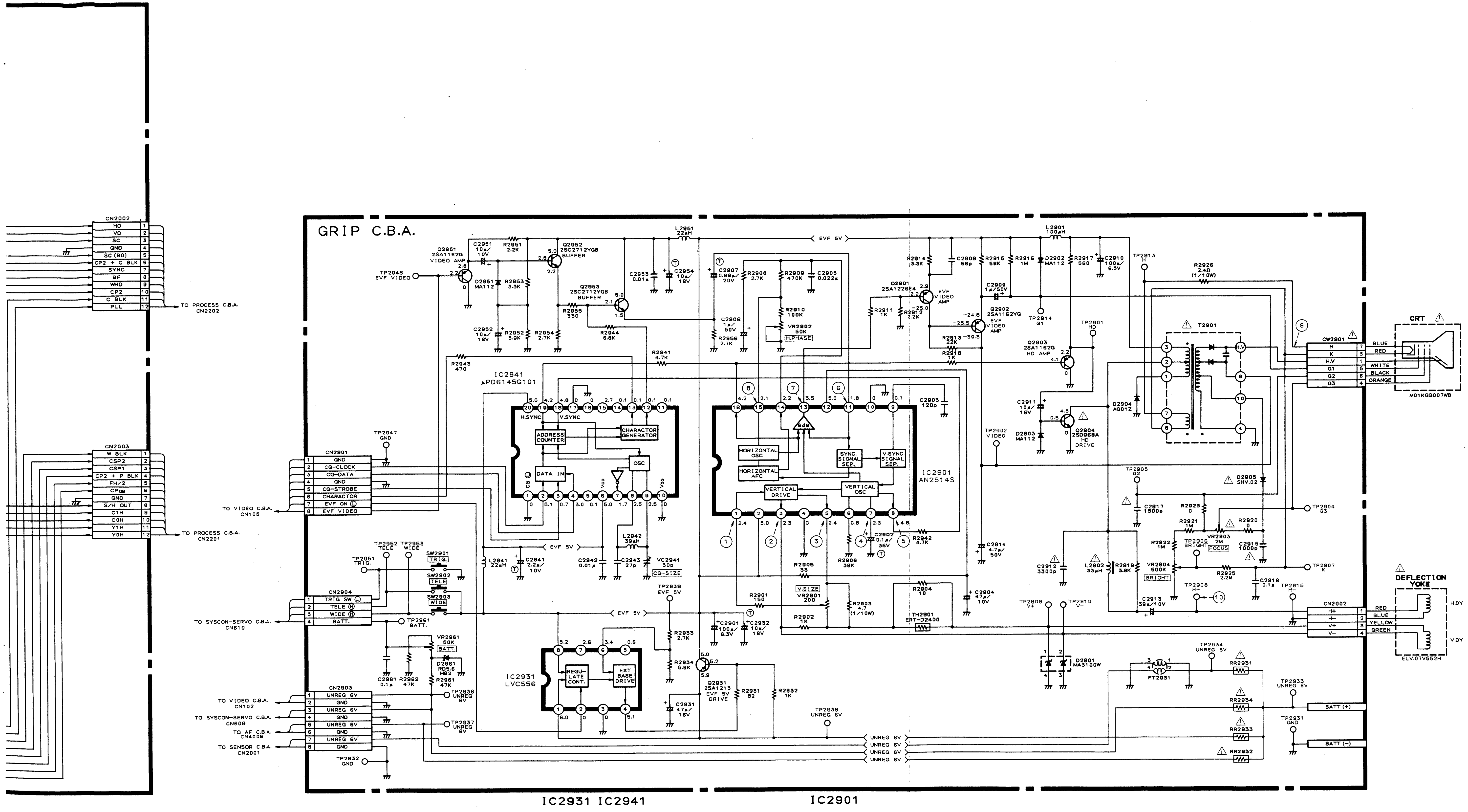
IC2151 IC2102 IC2101

GRIP C.B.A.



Q2951 2SA1162G VIDEO AMP
Q2952 2SC2712YGB BUFFER
Q2953 2SC2712YGB BUFFER
D2951 MA112
TP2948 EVF VIDEO
TP2947 GND
IC2941 µPD6145G101
H.SYNC
V.SYNC
ADDRESS COUNTER
CHARACTOR GENERATOR
DATA IN
OSC
CN2901
GND
CG-CLOCK
CG-DATA
GND
CG-STROBE
CHARACTOR
EVF ON
EVF VIDEO
TO VIDEO C.B.A. CN105
EVF 5V
CG-SIZE
TP2952 TELE
TP2953 WIDE
TP2951 TRIG.
SW2901 TRIG.
SW2902 TELE
SW2903 WIDE
CN2904
TRIG SW
TELE
WIDE
BATT.
TO SYSCON-SERVO C.B.A. CN610
TP2961 BATT.
VR2961 50K BATT.
D2961 RD5.6 MB2
IC2931 LVC556
REGU-LATE CONT.
EXT BASE DRIVE
CN2903
UNREG 6V
GND
TO VIDEO C.B.A. CN102
TO SYSCON-SERVO C.B.A. CN609
TO AF C.B.A. CN4006
TO SENSOR C.B.A. CN2001
TP2936 UNREG 6V
TP2937 UNREG 6V
TP2932 GND

IC2931 IC2941


GRIP C.B.A.
CN2002
HD
VD
SC
GND
SC (90)
CP2 + C BLK
SYNC
BF
WHD
CP2
C BLK
PLL
TO PROCESS C.B.A. CN2202
CN2003
W BLK
CSP2
CSP1
CP2 + P BLK
FH/2
GND
S/H OUT
C1H
C0H
Y1H
Y0H
TO PROCESS C.B.A. CN2201
CN2901
GND
CG-CLOCK
CG-DATA
GND
CG-STROBE
CHARACTOR
EVF ON
EVF VIDEO
TO VIDEO C.B.A. CN105
CN2904
TRIG SW
TELE
WIDE
BATT.
TO SYSCON-SERVO C.B.A. CN610
CN2903
UNREG 6V
GND
TO VIDEO C.B.A. CN102
TO SYSCON-SERVO C.B.A. CN609
TO AF C.B.A. CN4006
TO SENSOR C.B.A. CN2001
TP2948 EVF VIDEO
Q2951 2SA1162G VIDEO AMP
Q2952 2SC2712YG8 BUFFER
Q2953 2SC2712YG8 BUFFER
IC2941 μPD6145G101
H.SYNC
V.SYNC
ADDRESS COUNTER
CHARACTOR GENERATOR
DATA IN
OSC
CG-SIZE
IC2931 LVC556
REGULATE CONT.
EXT BASE DRIVE
Q2931 2SA1213 EVF 5V DRIVE
IC2901 AN2514S
HORIZONTAL OSC
HORIZONTAL AFC
SYNC. SIGNAL SEP.
V.SYNC SIGNAL SEP.
VERTICAL DRIVE
VERTICAL OSC
H.PHASE
V.SIZE
TH2901 ERT-D2400
EVF 5V
Q2901 2SA1226E4 EVF VIDEO AMP
Q2902 2SA1162YG EVF VIDEO AMP
Q2903 2SA1162G HD AMP
Q2904 2SD968A HD DRIVE
T2901
D2905 SHV.02
D2901 MA3100W
FT2931
BRIGHT
FOCUS
CRT
CW2901
BLUE
RED
WHITE
BLACK
ORANGE
M01KGG007WB
DEFLECTION YOKE
CN2902
H+
H−
V+
V−
YELLOW
GREEN
H.DY
V.DY
ELV.07V552H
BATT (+)
BATT (−)
UNREG 6V
IC2931 IC2941
IC2901

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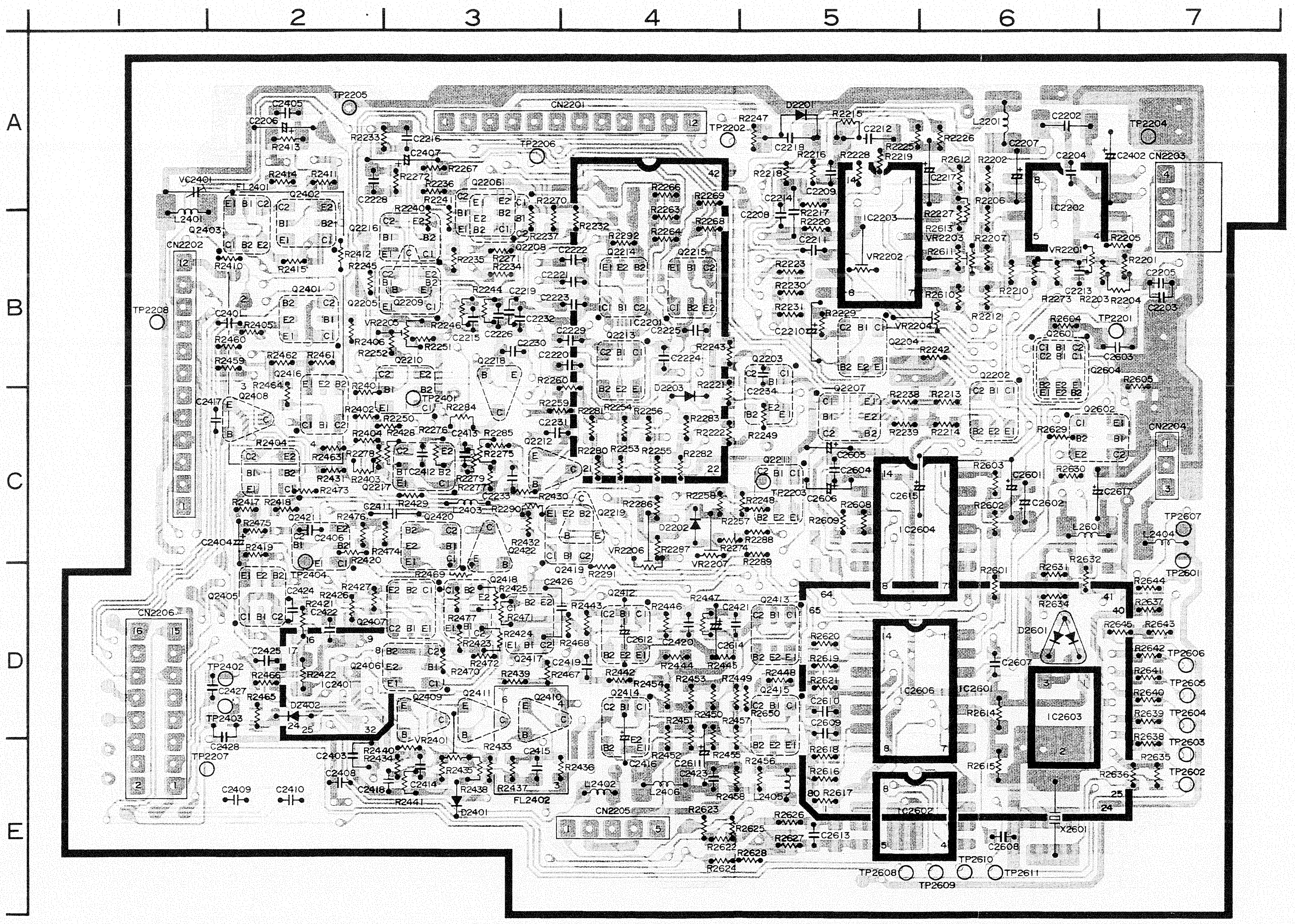
CIRCUIT BOARD DIAGRAM PROCESS・CAMERA-KEY C.B.A.

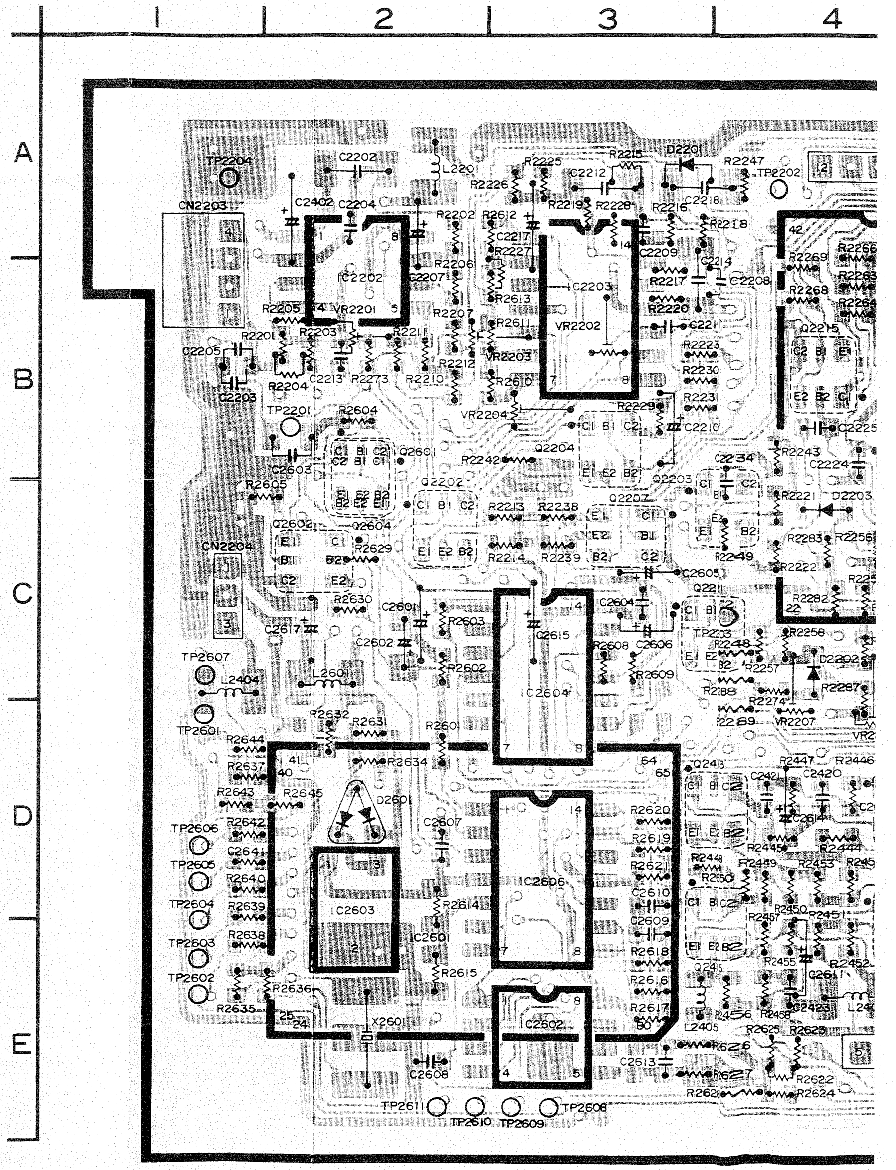
D2201	A-5
D2202	C-4
D2203	C-4
D2401	E-3
D2402	D-2
D2601	D-6
IC2201	B-4
IC2202	B-6
IC2203	B-5
IC2401	D-2
IC2601	D-6
IC2602	E-6
IC2603	D-6
IC2604	C-6
IC2606	D-6
Q2202	C-6
Q2203	C-5
Q2204	B-5
Q2205	B-3
Q2206	B-3
Q2207	C-5
Q2208	B-3
Q2209	B-3
Q2210	C-3
Q2211	C-5
Q2212	C-4
Q2213	B-4
Q2214	B-4
Q2215	B-4
Q2216	B-3
Q2217	C-3
Q2218	C-3
Q2219	C-4
Q2401	B-2
Q2402	B-2
Q2403	B-2
Q2404	C-2
Q2405	D-2
Q2406	D-3
Q2407	D-3
Q2408	C-2
Q2409	D-3
Q2410	D-3
Q2411	D-3
Q2412	D-4
Q2413	D-5
Q2414	D-4
Q2415	D-5
Q2416	C-2
Q2417	D-3
Q2418	D-3
Q2419	C-4
Q2420	C-3
Q2421	C-2
Q2422	C-3
Q2601	B-6
Q2602	C-6
Q2604	B-6

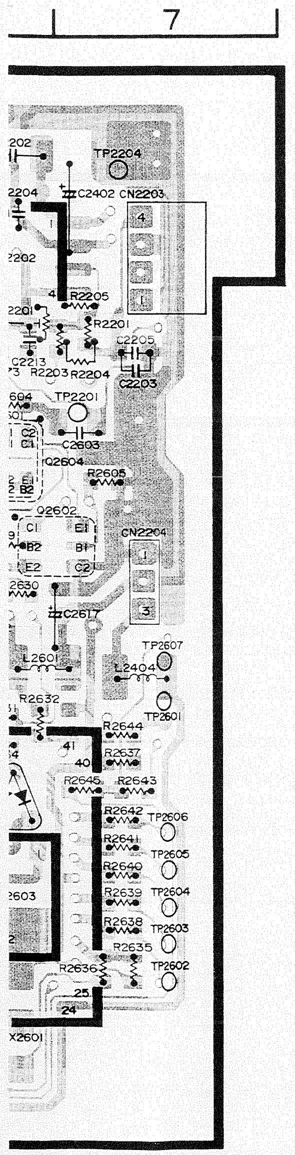
PROCESS C.B.A. (COMPONENT SIDE)


1
2
3
4
5
6
7
A
B
C
D
E
IC2201
IC2202
IC2203
IC2401
IC2601
IC2602
IC2603
IC2604
IC2606
CN2201
CN2202
CN2203
CN2204
CN2205
CN2206
X2601
FL2402
TP2201
TP2202
TP2204
TP2205
TP2206
TP2207
TP2208
TP2401
TP2402
TP2403
TP2601
TP2602
TP2603
TP2604
TP2605
TP2606
TP2607
TP2608
TP2609
TP2610
TP2611

D2201	A-3
D2202	C-4
D2203	C-4
D2401	E-5
D2402	D-6
D2601	D-2
IC2201	B-4
IC2202	B-2
IC2203	B-3
IC2401	D-6
IC2601	E-2
IC2602	E-3
IC2603	D-2
IC2604	C-3
IC2606	D-3
Q2202	C-2
Q2203	C-4
Q2204	B-3
Q2205	B-6
Q2206	B-5
Q2207	C-3
Q2208	B-5
Q2209	B-6
Q2210	C-6
Q2211	C-4
Q2212	C-5
Q2213	B-4
Q2214	B-4
Q2215	B-4
Q2216	B-6
Q2217	C-6
Q2218	C-5
Q2219	C-5
Q2401	B-6
Q2402	B-6
Q2403	B-7
Q2404	C-6
Q2405	D-7
Q2406	D-6
Q2407	D-6
Q2408	C-7
Q2409	D-5
Q2410	D-5
Q2411	D-5
Q2412	D-4
Q2413	D-4
Q2414	D-4
Q2415	E-4
Q2416	C-6
Q2417	D-5
Q2418	D-5
Q2419	D-5
Q2420	C-5
Q2421	C-6
Q2422	D-5
Q2601	B-2
Q2602	C-2
Q2604	C-2

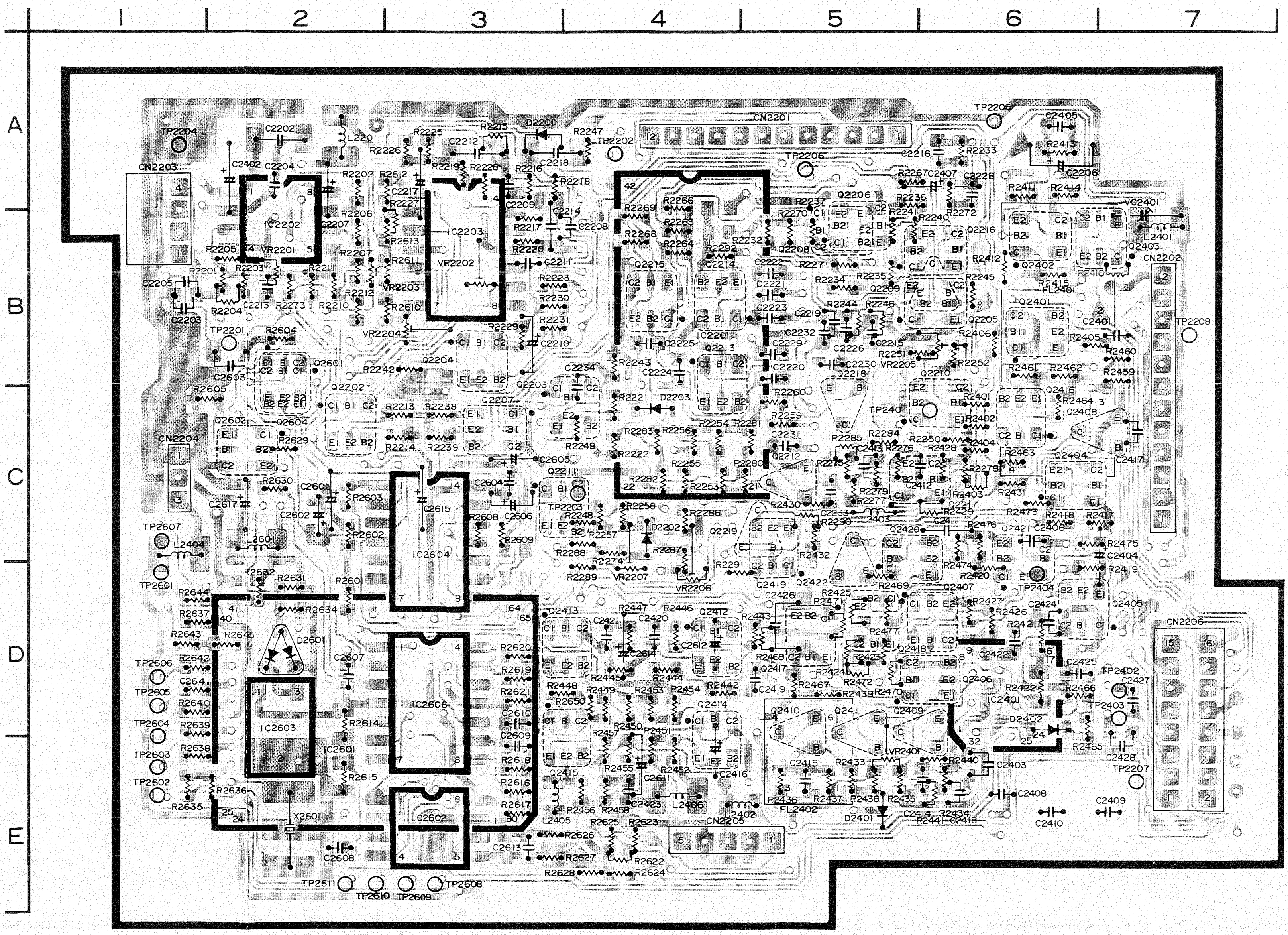
PROCESS C.B.A. (SOLDERING SIDE


1
2
3
4
A
B
C
D
E
IC2202
IC2203
IC2603
IC2604
IC2606
IC2601
IC2602
CN2203
CN2204
X2601
TP2201
TP2202
TP2204
TP2601
TP2602
TP2603
TP2604
TP2605
TP2606
TP2607
TP2608
TP2609
TP2610
TP2611


7
TP2204
CN2203
C2402
R2205
R2201
R2203
R2204
C2205
C2203
TP2201
C2603
Q2604
R2605
CN2204
TP2607
L2601
L2404
TP2601
R2632
R2644
R2637
R2645
R2643
TP2606
TP2605
TP2604
TP2603
TP2602
R2636
X2601

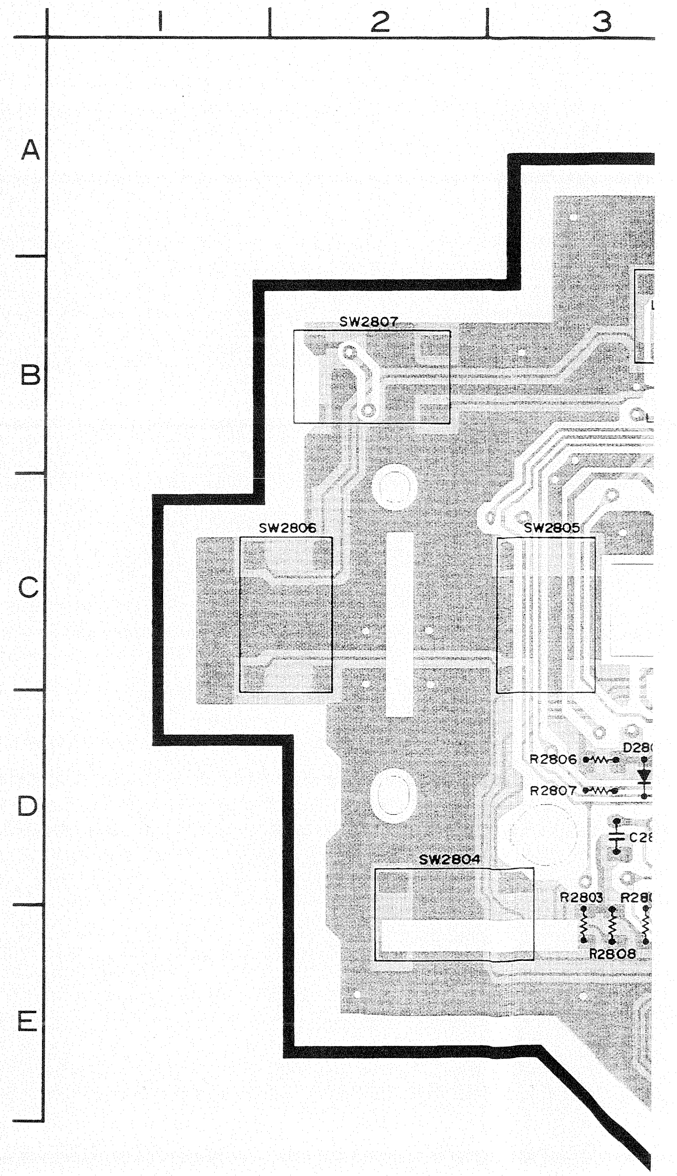
D2201	A−3
D2202	C−4
D2203	C−4
D2401	E−5
D2402	D−6
D2601	D−2
IC2201	B−4
IC2202	B−2
IC2203	B−3
IC2401	D−6
IC2601	E−2
IC2602	E−3
IC2603	D−2
IC2604	C−3
IC2606	D−3
Q2202	C−2
Q2203	C−4
Q2204	B−3
Q2205	B−6
Q2206	B−5
Q2207	C−3
Q2208	B−5
Q2209	B−6
Q2210	C−6
Q2211	C−4
Q2212	C−5
Q2213	B−4
Q2214	B−4
Q2215	B−4
Q2216	B−6
Q2217	C−6
Q2218	C−5
Q2219	C−5
Q2401	B−6
Q2402	B−6
Q2403	B−7
Q2404	C−6
Q2405	D−7
Q2406	D−6
Q2407	D−6
Q2408	C−7
Q2409	D−5
Q2410	D−5
Q2411	D−5
Q2412	D−4
Q2413	D−4
Q2414	D−4
Q2415	E−4
Q2416	C−6
Q2417	D−5
Q2418	D−5
Q2419	D−5
Q2420	C−5
Q2421	C−6
Q2422	D−5
Q2601	B−2
Q2602	C−2
Q2604	C−2

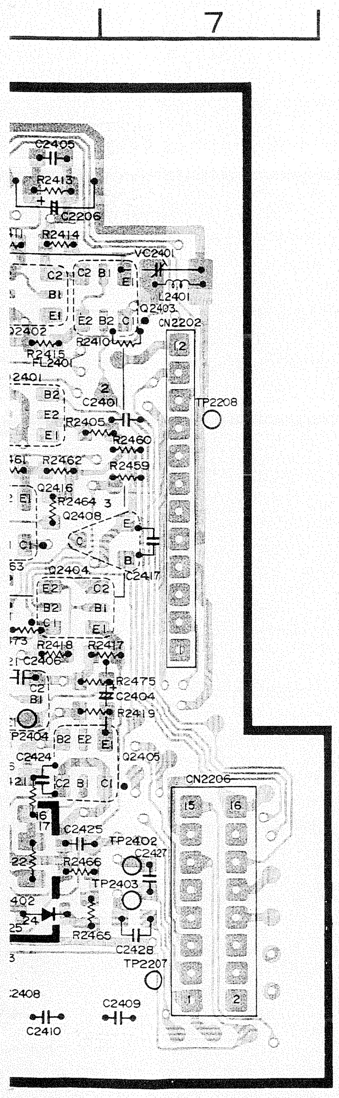
PROCESS C.B.A. (SOLDERING SIDE)


1
2
3
4
5
6
7
A
B
C
D
E
TP2204
CN2203
IC2202
VR2201
L2201
IC2203
VR2202
D2201
CN2201
TP2202
TP2205
TP2206
IC2201
CN2202
TP2208
VR2203
VR2204
VR2205
CN2204
TP2607
TP2601
L2404
IC2604
IC2606
IC2603
IC2602
IC2601
IC2401
D2601
D2202
D2203
D2401
D2402
VR2206
VR2207
VR2401
FL2401
FL2402
L2401
L2402
L2405
L2406
CN2205
CN2206
X2601
TP2606
TP2605
TP2604
TP2603
TP2602
TP2611
TP2610
TP2609
TP2608
TP2402
TP2403
TP2404
TP2207
TP2401

CAMERA KEY C.B.A.

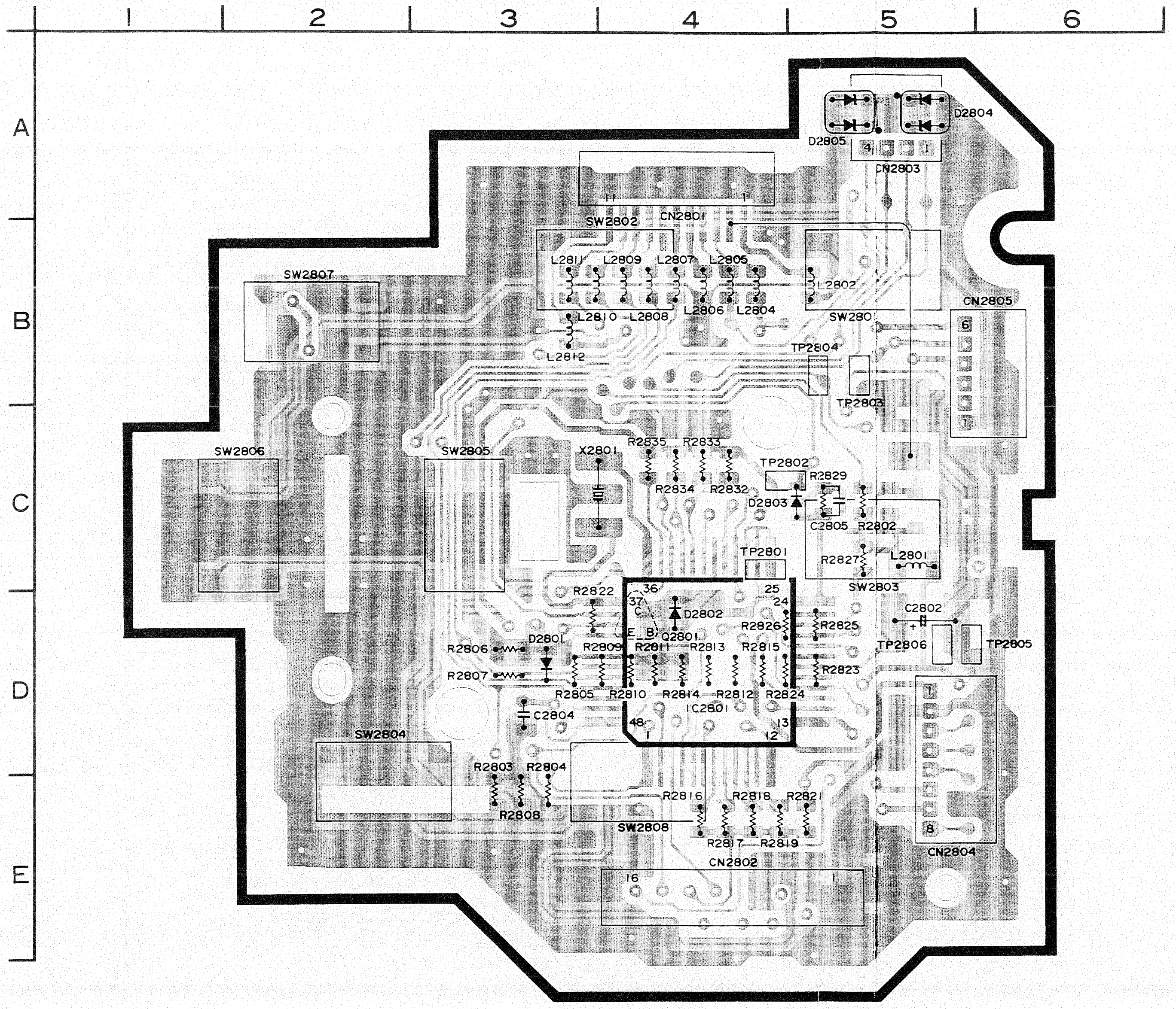
D2801	D−3
D2802	D−4
D2803	C−5
D2804	A−5
D2805	A−5
IC2801	D−4
Q2801	D−4


1
2
3
A
B
C
D
E
SW2807
SW2806
SW2805
SW2804
R2806
R2807
R2803
R2808


7
C2405
R2413
C2206
R2414
VC2401
L2401
Q2403
CN2202
R2410
TP2208
C2401
R2405
R2460
R2462
R2459
Q2416
R2464
Q2408
C2417
C2404
R2418
R2417
R2475
C2404
R2419
Q2405
CN2206
C2425
TP2402
R2466
TP2403
R2465
C2428
TP2207
C2409
C2410

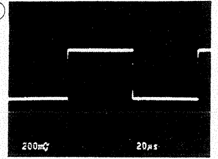
CAMERA KEY C.B.A.

D2801	D−3
D2802	D−4
D2803	C−5
D2804	A−5
D2805	A−5
IC2801	D−4
Q2801	D−4


1
2
3
4
5
6
A
B
C
D
E
D2805
D2804
CN2803
SW2802
CN2801
L2811
L2809
L2807
L2805
L2802
L2810
L2808
L2806
L2804
L2812
SW2807
SW2801
CN2805
TP2804
TP2803
SW2806
SW2805
X2801
R2835
R2833
R2834
R2832
TP2802
R2829
D2803
C2805
R2802
R2827
L2801
TP2801
SW2803
R2822
36
37
25
24
D2802
R2826
R2825
C2802
R2806
D2801
R2809
Q2801
R2811
R2813
R2815
R2823
TP2806
TP2805
R2807
R2805
R2810
R2814
R2812
R2824
IC2801
C2804
48
1
12
13
SW2804
R2803
R2804
R2808
R2816
R2818
R2821
SW2808
R2817
R2819
CN2802
CN2804
16
8

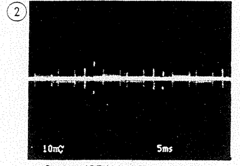
SIGNAL WAVEFORMS

1. TP2208

①


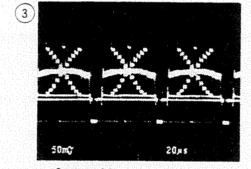
1−1 (COLOR BAR)

2. TP2212

②


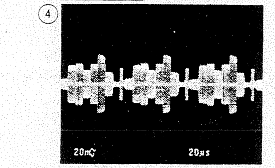
2−1 (GRAY SCALE)

3. TP2213

③


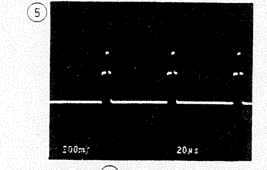
3−1 (GRAY SCALE)

4. TP2214

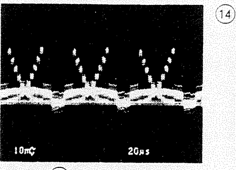
④


4−1 (COLOR BAR)

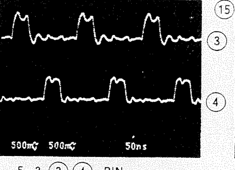
5. IC2201

⑤


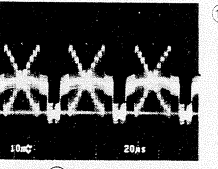
5−1 ① PIN

⑥


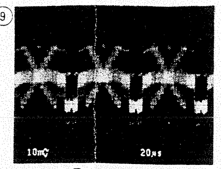
5−2 ② PIN

⑦


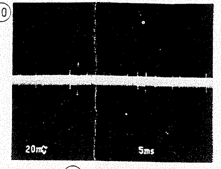
5−3 ③ ④ PIN

⑧


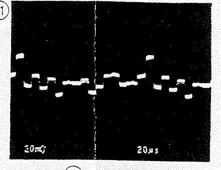
5−4 ⑩ PIN

⑨


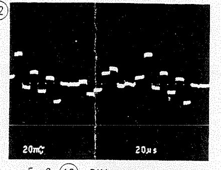
5−5 ⑬ PIN

⑩


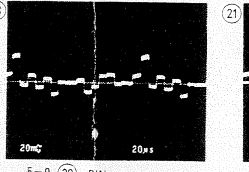
5−6 ⑭ PIN

⑪


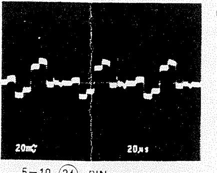
5−7 ⑰ PIN

⑫


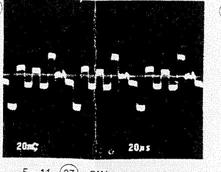
5−8 ⑲ PIN

⑬


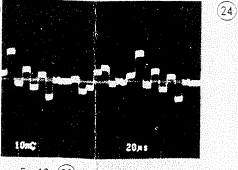
5−9 ⑳ PIN

⑭


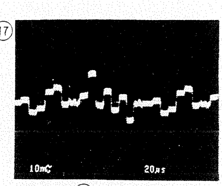
5−10 ㉔ PIN

⑮


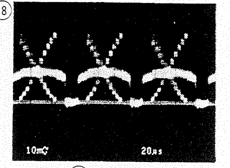
5−11 ㉗ PIN

⑯


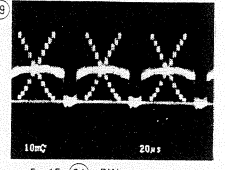
5−12 ㉙ PIN

⑰


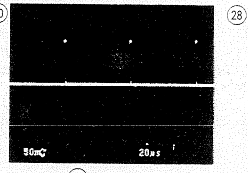
5−13 ㉚ PIN

⑱


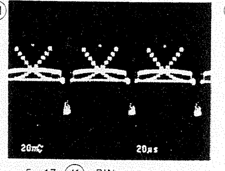
5−14 ㉛ PIN

⑲


5−15 ㉞ PIN

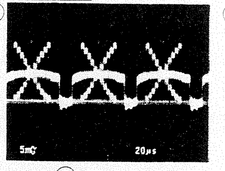
⑳


5−16 ㊵ PIN

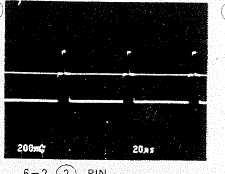
㉑


5−17 ㊶ PIN

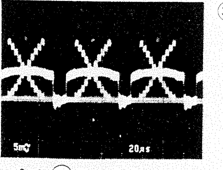
6. IC2301

㉒


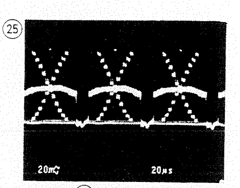
6−1 ① PIN

㉓


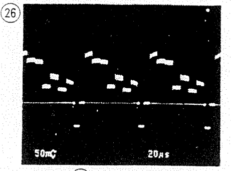
6−2 ② PIN

㉔


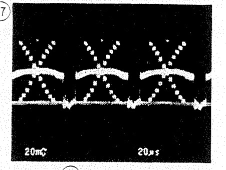
6−3 ⑦ PIN

㉕


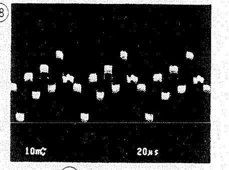
6−4 ⑯ PIN

㉖


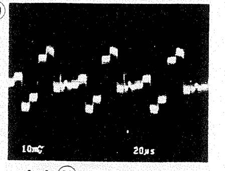
6−5 ⑱ PIN

㉗


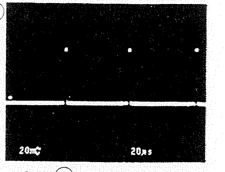
6−6 ⑳ PIN

㉘


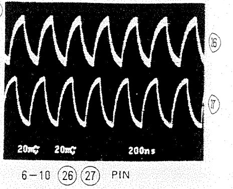
6−7 ㉒ PIN

㉙


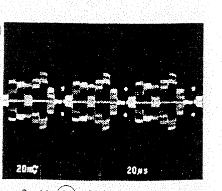
6−8 ㉓ PIN

㉚


6−9 ㉔ PIN

㉛


6−10 ㉖ ㉗ PIN

㉜


6−11 ㉛ PIN

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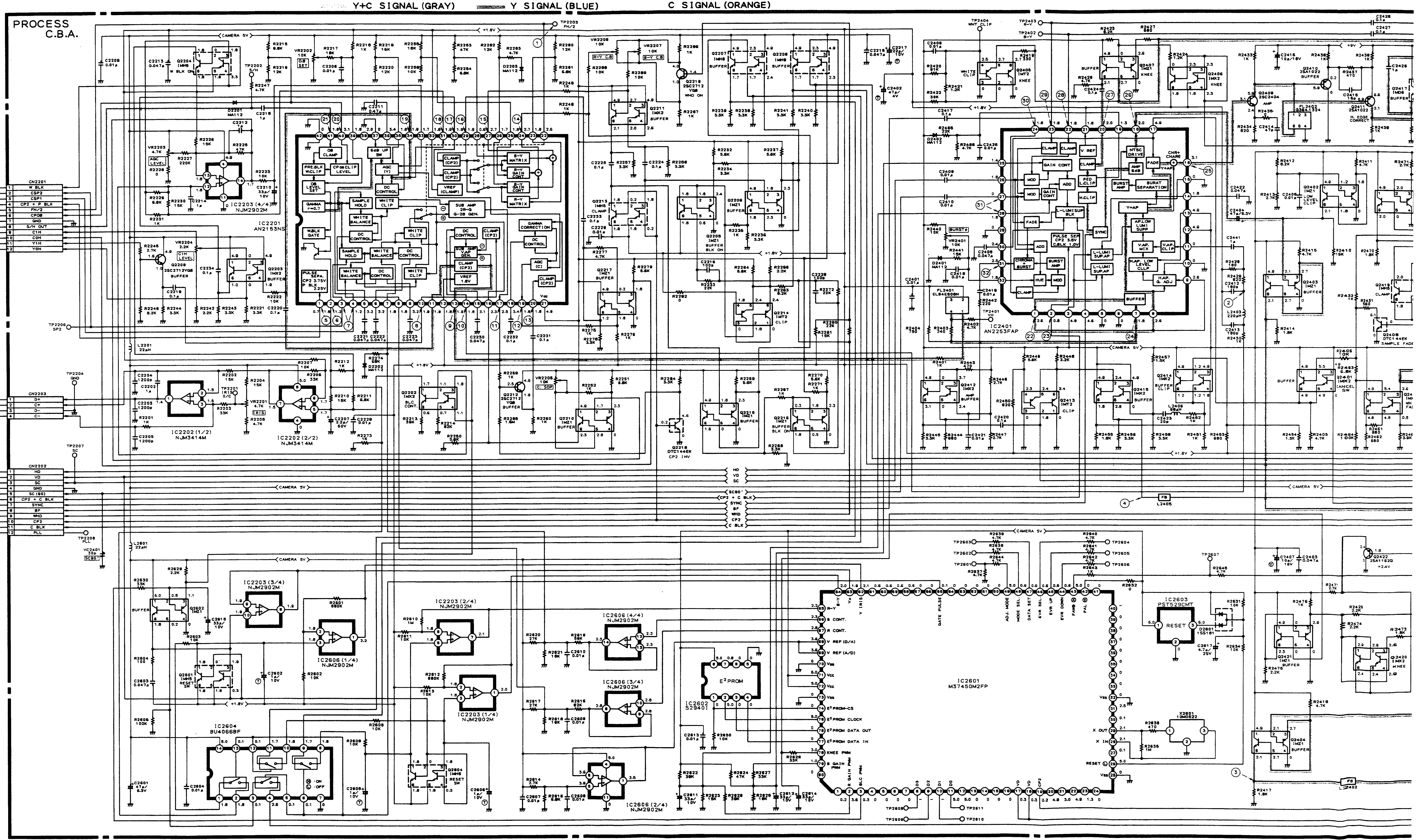
SCHEMATIC DIAGRAM PROCESS • CAMERA-KEY C.B.A.

○SIGNAL PATH
Y+C SIGNAL (GRAY)
Y SIGNAL (BLUE)
C SIGNAL (ORANGE)



PROCESS C.B.A.
TO SENSOR C.B.A. CN2003
TO IG METER
TO SENSOR C.B.A. CN2002
CN2201
CN2203
CN2202
IC2201 AN2153NS
IC2202 (1/2) NJM3414M
IC2202 (2/2) NJM3414M
IC2203 (4/4) NJM2902M
IC2203 (3/4) NJM2902M
IC2203 (2/4) NJM2902M
IC2203 (1/4) NJM2902M
IC2606 (1/4) NJM2902M
IC2606 (2/4) NJM2902M
IC2606 (3/4) NJM2902M
IC2606 (4/4) NJM2902M
IC2604 BU4066BF
IC2602 S29401
E²PROM
IC2601 M37450M2FP
IC2603 PST529CMT
IC2401 AN2253FAP
CAMERA 5V
+1.8V

IC2202 (1/2) IC2203 (4/4) IC2202 (2/2)
IC2604 IC2203 (3/4) IC2606 (1/4)

IC2201
IC2203 (1/4, 2/4)

IC2606 (2/4, 3/4, 4/4)

IC2602

IC2601

IC2401

IC2603

01 Oct. 1989

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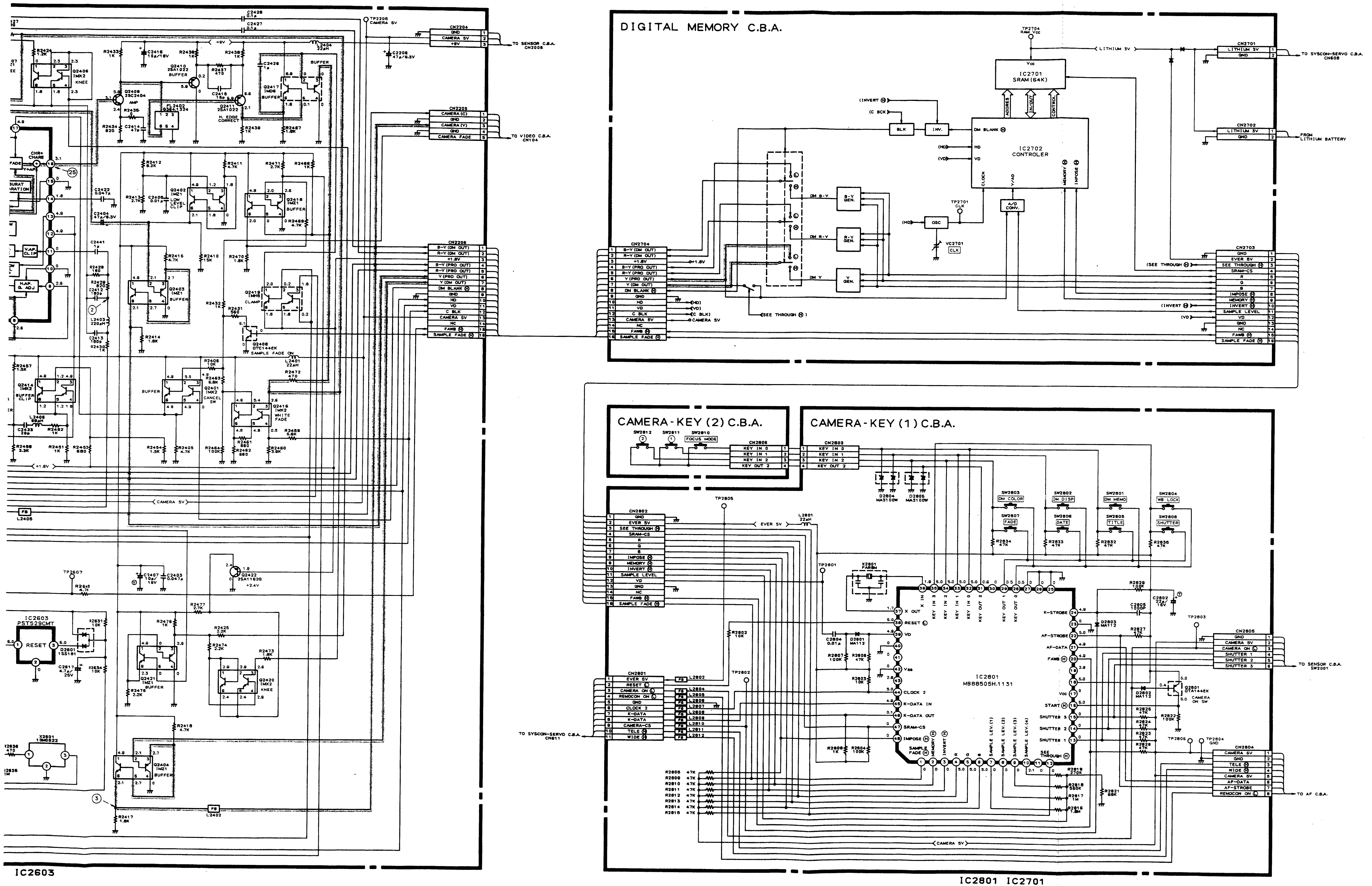
DIGITAL MEMORY C.B.A.
CAMERA-KEY (2) C.B.A.
CAMERA-KEY (1) C.B.A.
IC2701 SRAM (64K)
IC2702 CONTROLER
IC2801 MB88505H.1131
IC2603 PST529CMT
RESET
TP2704 RAM Vcc
LITHIUM 3V
CN2701
LITHIUM 3V
GND
TO SYSCON-SERVO C.B.A. CN608
CN2702
LITHIUM 3V
GND
FROM LITHIUM BATTERY
BLK
INV.
DM BLANK Ⓗ
HD
VD
CLOCK
Y/AD
MEMORY Ⓗ
IMPOSE Ⓗ
ADDRESS
IN/OUT
CONTROL
B-Y GEN.
R-Y GEN.
Y GEN.
A/D CONV.
OSC
TP2701 CLK
VC2701 CLK
DM B-Y
DM R-Y
DM Y
(SEE THROUGH Ⓗ)
(INVERT Ⓗ)
(C BCK)
(HD)
(VD)
(C BLK)
CAMERA 5V
+1.8V
CN2204
GND
CAMERA 5V
+9V
TO SENSOR C.B.A. CN2006
CN2205
CAMERA (C)
GND
CAMERA (Y)
GND
CAMERA FADE
TO VIDEO C.B.A. CN104
CN2206
1 B-Y (DM OUT)
2 R-Y (DM OUT)
3 +1.8V
4 B-Y (PRO OUT)
5 R-Y (PRO OUT)
6 Y (PRO OUT)
7 Y (DM OUT)
8 DM BLANK Ⓗ
9 GND
10 HD
11 VD
12 C BLK
13 CAMERA 5V
14 NC
15 FAWB Ⓗ
16 SAMPLE FADE Ⓗ
CN2704
1 B-Y (DM OUT)
2 R-Y (DM OUT)
3 +1.8V
4 B-Y (PRO OUT)
5 R-Y (PRO OUT)
6 Y (PRO OUT)
7 Y (DM OUT)
8 DM BLANK Ⓗ
9 GND
10 HD
11 VD
12 C BLK
13 CAMERA 5V
14 NC
15 FAWB Ⓗ
16 SAMPLE FADE Ⓗ
CN2703
1 GND
2 EVER 5V
3 SEE THROUGH Ⓗ
4 SRAM-CS
5 R
6 G
7 B
8 IMPOSE Ⓗ
9 MEMORY Ⓗ
10 INVERT Ⓗ
11 SAMPLE LEVEL
12 VD
13 GND
14 NC
15 FAWB Ⓗ
16 SAMPLE FADE Ⓗ
CN2802
1 GND
2 EVER 5V
3 SEE THROUGH Ⓗ
4 SRAM-CS
5 R
6 G
7 B
8 IMPOSE Ⓗ
9 MEMORY Ⓗ
10 INVERT Ⓗ
11 SAMPLE LEVEL
12 VD
13 GND
14 NC
15 FAWB Ⓗ
16 SAMPLE FADE Ⓗ
CN2801
1 EVER 5V
2 RESET Ⓛ
3 CAMERA ON Ⓛ
4 REMOCON ON Ⓛ
5 GND
6 CLOCK 2
7 K-DATA
8 K-DATA
9 CAMERA-CS
10 TELE Ⓗ
11 WIDE Ⓗ
TO SYSCON-SERVO C.B.A. CN611
CN2806
KEY IN 0
KEY IN 1
KEY IN 2
KEY OUT 2
CN2803
KEY IN 0
KEY IN 1
KEY IN 2
KEY OUT 2
SW2812
SW2811
SW2810 FOCUS MODE
SW2803 DM COLOR
SW2802 DM DISP
SW2801 DM MEMO
SW2804 WB LOCK
SW2807 FADE
SW2806 DATE
SW2805 TITLE
SW2808 SHUTTER
D2804 MA3100W
D2805 MA3100W
X2801 FAR8M
CN2805
1 GND
2 CAMERA 5V
3 CAMERA ON Ⓛ
4 SHUTTER 1
5 SHUTTER 2
6 SHUTTER 3
TO SENSOR C.B.A. SW2001
Q2801 DTA144EK
CAMERA ON SW
TP2806
TP2804 GND
CN2804
1 CAMERA 5V
2 GND
3 TELE Ⓗ
4 WIDE Ⓗ
5 CAMERA 5V
6 AF-DATA
7 AF-STROBE
8 REMOCON ON Ⓛ
TO AF C.B.A.
X OUT
RESET
VD
VSS
CLOCK 2
K-DATA IN
K-DATA OUT
SRAM-CS
IMPOSE Ⓗ
K-STROBE
AF-STROBE
AF-DATA
FAWB Ⓗ
START Ⓗ
SHUTTER 3
SHUTTER 2
SHUTTER 1
SAMPLE FADE Ⓗ
SEE THROUGH Ⓗ
R2808 47K
R2809 47K
R2810 47K
R2811 47K
R2812 47K
R2813 47K
R2814 47K
R2815 47K
CAMERA 5V
EVER 5V
L2801 22µH
TP2805
TP2801
TP2802
TP2803
TP2205 CAMERA 5V
C2206 47µ/6.3V
Q2406 IMX2 KNEE
Q2408 2SC2404 AMP
Q2410 2SA1022 BUFFER
Q2411 2SA1022
H. EDGE CORRECT
Q2417 IMD6 BUFFER
Q2402 IMZ1 LOW LEVEL CLIP
Q2418 IMZ1 BUFFER
Q2403 IMZ1 BUFFER
Q2415 IMH3 CLAMP
Q2409 DTC144EK SAMPLE FADE ON
Q2414 IMX2 BUFFER CLIP
Q2401 IMX2 CANCEL SW
Q2416 IMX2 WHITE FADE
Q2422 2SA1620
Q2421 IMZ1 BUFFER
Q2420 IMX2 KNEE
Q2404 IMZ1 BUFFER
D2801 1SS181
X2801 10M0822
V.AP. CLIP
H.AP. G. ADJ
FADE
CHARE
L2405
L2402
TP2607
+1.8V

IC2603

IC2801 IC2701
IC2702

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Ⅳ-8

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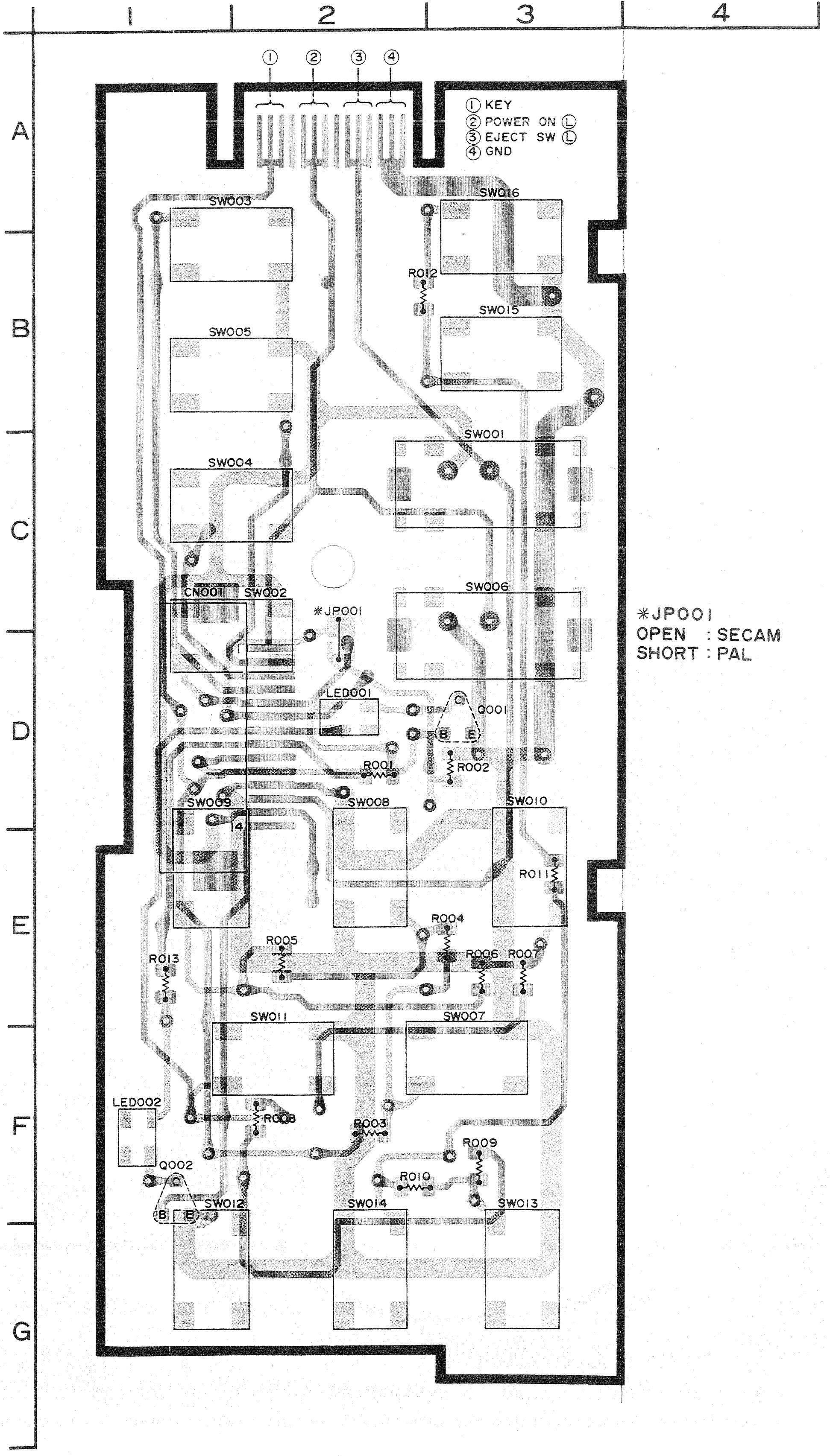
CIRCUIT BOARD DIAGRAM SYSCON-SERVO · RECORDER-KEY C.B.A.

RECORDER-KEY C.B.A.

Q001	D-3
Q002	F-1


1
2
3
4
A
B
C
D
E
F
G
①
②
③
④
① KEY
② POWER ON Ⓛ
③ EJECT SW Ⓛ
④ GND
SW003
SW016
R012
SW015
SW005
SW001
SW004
CN001
SW002
*JP001
SW006
LED001
Q001
C
B
E
R001
R002
SW009
SW008
SW010
R011
R004
R005
R006
R007
R013
SW011
SW007
LED002
R008
R003
R009
R010
Q002
C
B
E
SW012
SW014
SW013

*JP001
OPEN : SECAM
SHORT : PAL

SYSCON-SERVO C.B.A.

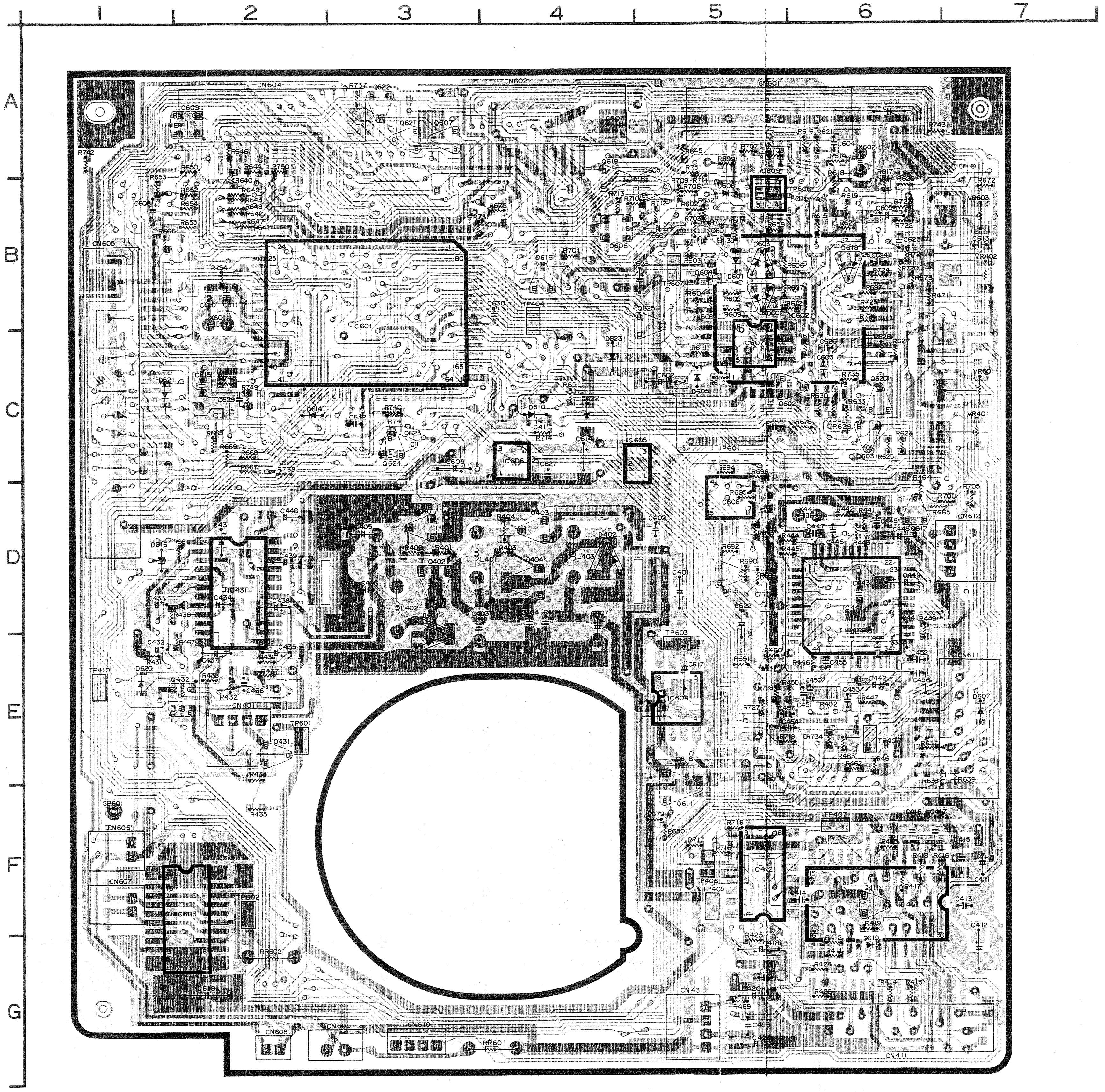
D401	E-3
D402	D-4
D411	C-4
D601	B-5
D602	B-5
D603	B-5
D604	B-5
D605	C-5
D606	B-5
D607	E-7
D610	C-4
D614	C-2
D616	D-1
D618	B-6
D619	G-6
D620	E-1
D621	C-1
D622	C-4
D623	C-4
IC411	F-6
IC412	F-5
IC431	D-2
IC441	D-6
IC601	B-3
IC602	B-6
IC603	F-2
IC604	E-5
IC605	C-5
IC606	C-4
IC607	C-5
IC608	D-5
IC609	B-5
Q401	D-3
Q402	D-3
Q403	D-4
Q404	D-4
Q411	F-6
Q431	E-2
Q432	E-2
Q601	B-5
Q602	C-6
Q603	C-6
Q605	B-5
Q606	B-4
Q607	A-3

Q609	A-2
Q611	F-5
Q615	D-5
Q616	B-4
Q617	D-6
Q619	A-4
Q620	C-6
Q621	A-3
Q622	A-3
Q623	C-3
Q624	C-3
Q625	B-5

N-SERVO C.B.A.

E－3
D－4
C－4
B－5
B－5
B－5
B－5
C－5
B－5
E－7
C－4
C－2
D－1
B－6
G－6
E－1
C－1
C－4
C－4
F－6
F－5
D－2
D－6
B－3
B－6
F－2
E－5
C－5
C－4
C－5
D－5
B－5
D－3
D－3
D－4
D－4
F－6
E－2
E－2
B－5
C－6
C－6
B－5
B－4
A－3

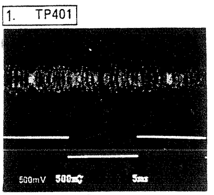
Q609	A－2
Q611	F－5
Q615	D－5
Q616	B－4
Q617	D－6
Q619	A－4
Q620	C－6
Q621	A－3
Q622	A－3
Q623	C－3
Q624	C－3
Q625	B－5


1
2
3
4
5
6
7
A
B
C
D
E
F
G
CN602
CN604
CN605
CN606
CN607
CN608
CN609
CN610
CN612
CN611
CN401
CN431
CN411
IC601
IC602
IC604
IC605
IC606
IC607
IC608
IC431
IC441
IC442
IC603
TP401
TP402
TP404
TP405
TP406
TP407
TP410
TP601
TP602
TP603
SP601

SIGNAL WAVEFORMS

1. TP401

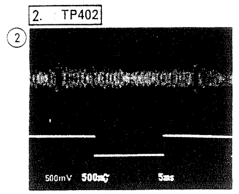
①



FH-16KHZ (PB)

2. TP402

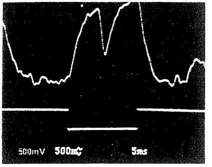
②



FH-47KHZ (PB)

3. TP404

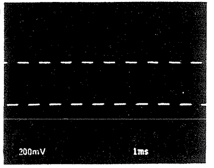
③



ATF-E (PB)

4. TP405

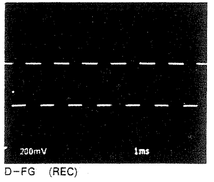
④



C-FG (REC)

5. TP406

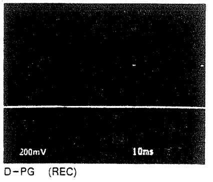
⑤



D-FG (REC)

6. TP407

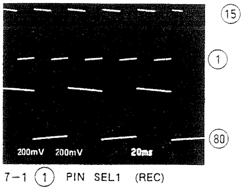
⑥



D-PG (REC)

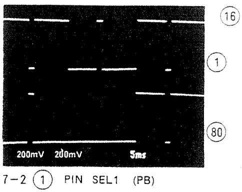
7. IC601

⑦



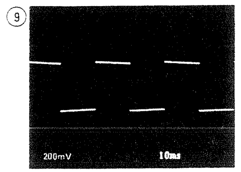
7－1 ① PIN SEL1 (REC)
(80) PIN SEL2 (REC)

⑧



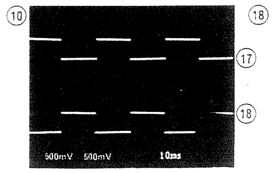
7－2 ① PIN SEL1 (PB)
(80) PIN SEL2 (PB)

⑨



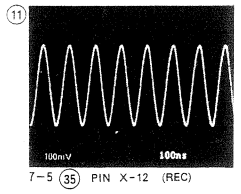
7－3 ② PIN HEAD SW PULSE (REC)

⑩



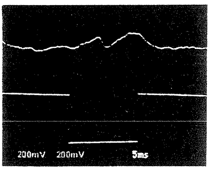
7－4 ⑰ PIN SW PULSE1 (REC)
⑱ PIN SW PULSE2 (REC)

⑪



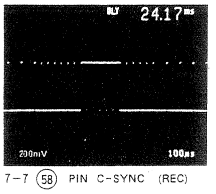
7－5 ㉟ PIN X-12 (REC)

⑫



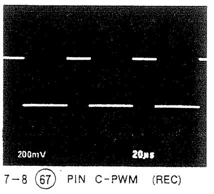
7－6 (51) PIN ATF ERROR (PB)

⑬



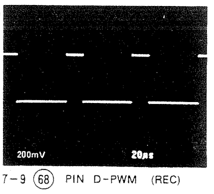
7－7 (58) PIN C-SYNC (REC)

⑭



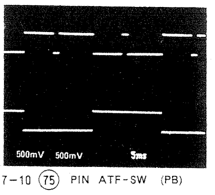
7－8 (67) PIN C-PWM (REC)

⑮



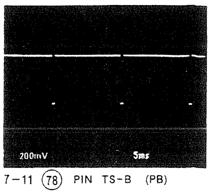
7－9 (68) PIN D-PWM (REC)

⑯



7－10 (75) PIN ATF-SW (PB)

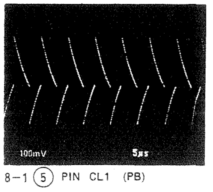
⑰



7－11 (78) PIN TS-B (PB)

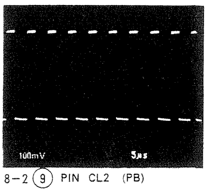
8. IC602

⑱



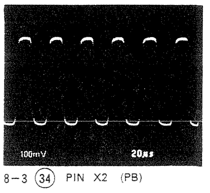
8－1 ⑤ PIN CL1 (PB)

⑲



8－2 ⑨ PIN CL2 (PB)

⑳



8－3 ㉞ PIN X2 (PB)

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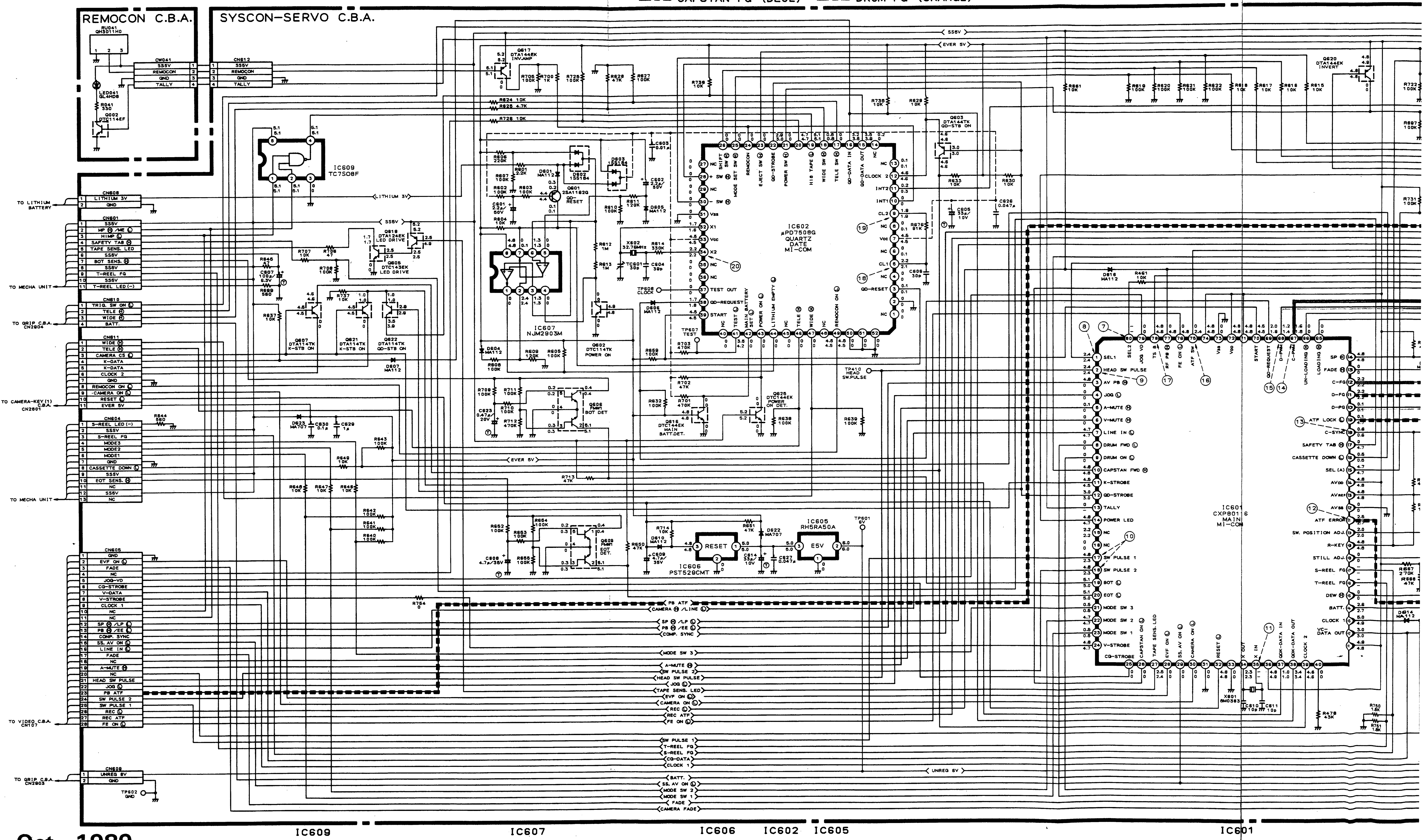
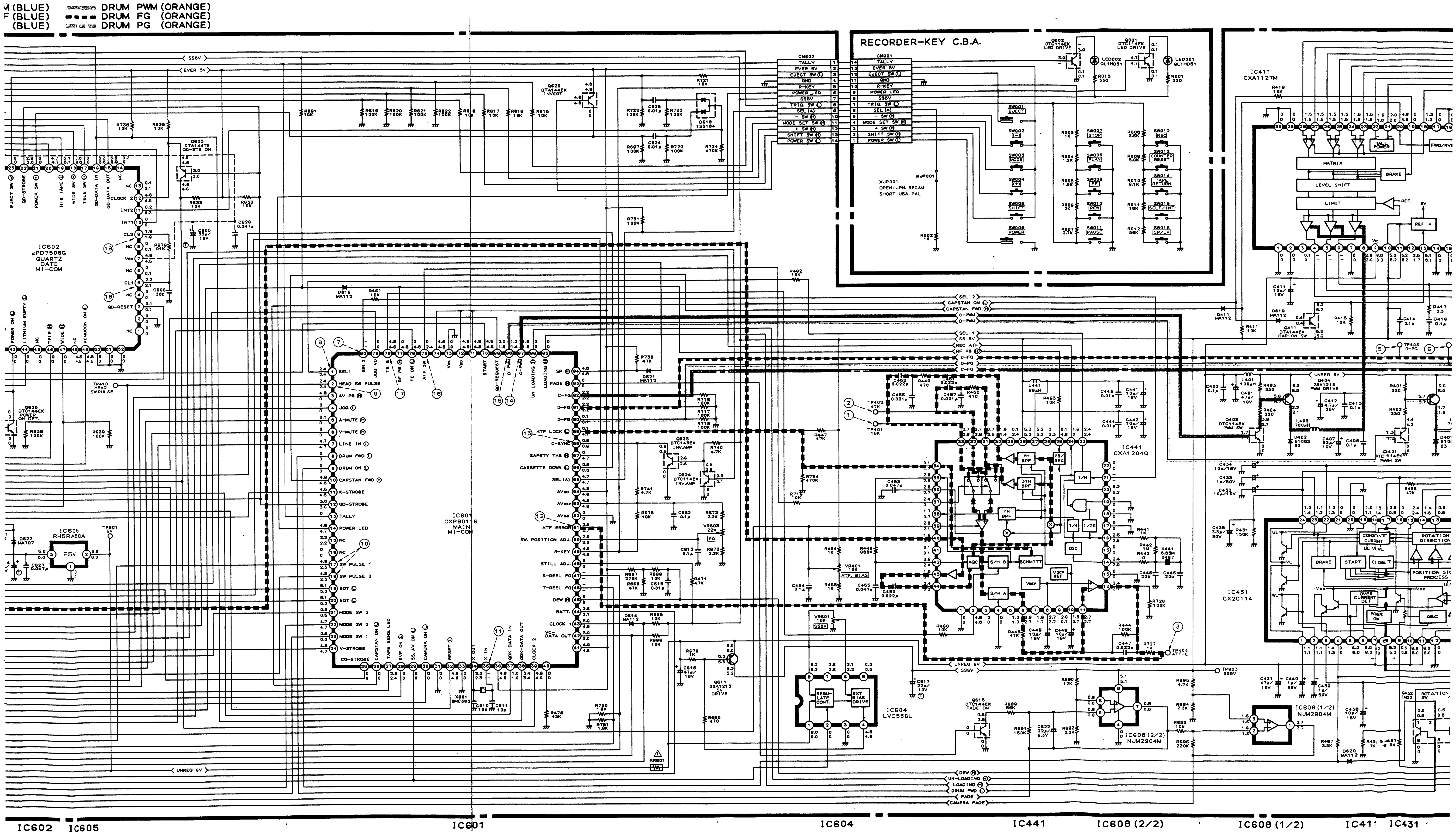
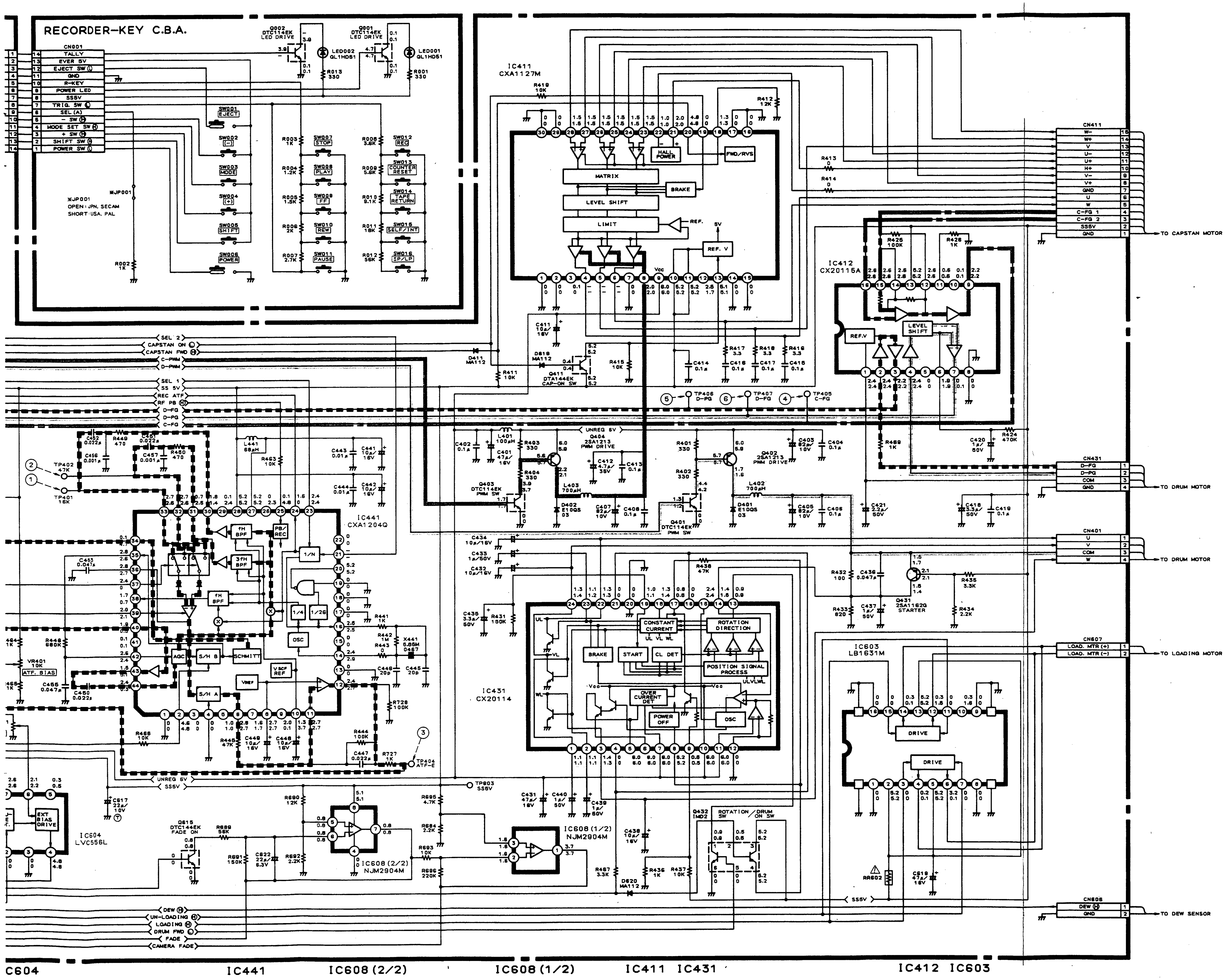
SCHEMATIC DIAGRAM SYSCON-SERVO • RECORDER-KEY C.B.A.

○SIGNAL PATH	
▬▬ CAPSTAN PWM (BLUE)	▨ DRUM PWM (ORANGE)
╍╍ CAPSTAN ATF (BLUE)	╍╍ DRUM FG (ORANGE)
╍╍ CAPSTAN FG (BLUE)	╍╍ DRUM PG (ORANGE)


REMOCON C.B.A.
SYSCON-SERVO C.B.A.
TO LITHIUM BATTERY
TO MECHA UNIT
TO GRIP C.B.A. CN2804
TO CAMERA-KEY (1) C.B.A. CN2801
TO MECHA UNIT
TO VIDEO C.B.A. CN107
TO GRIP C.B.A. CN2803
IC609 TC7S08F
IC607 NJM2903M
IC602 μPD7508G QUARTZ DATE MI-COM
IC606 PST529CMT
IC605 RH5RA50A
IC601 CXP80116 MAIN MI-COM
RESET
E5V
SS5V
EVER 5V
UNREG 6V
LITHIUM 3V
IC609
IC607
IC606
IC602
IC605
IC601

01 Oct. 1989


(BLUE) DRUM PWM (ORANGE)
(BLUE) DRUM FG (ORANGE)
(BLUE) DRUM PG (ORANGE)
SS5V
EVER 5V
UNREG 6V
RECORDER-KEY C.B.A.
CN602
CN001
TALLY
EVER 5V
EJECT SW (L)
GND
R-KEY
POWER LED
SS5V
TRIG. SW (L)
SEL (A)
- SW (H)
MODE SET SW (H)
+ SW (H)
SHIFT SW (H)
POWER SW (L)
SW001 EJECT
SW002 (-)
SW003 MODE
SW004 (+)
SW005 SHIFT
SW006 POWER
SW007 STOP
SW008 PLAY
SW009 FF
SW010 REW
SW011 PAUSE
SW012 REC
SW013 COUNTER RESET
SW014 TAPE RETURN
SW015 SELF/INT
SW016 SP/LP
Q002 DTC114EK LED DRIVE
Q001 DTC114EK LED DRIVE
LED002 GL1HD51
LED001 GL1HD51
WJP001 OPEN: JPN. SECAM SHORT: USA. PAL
IC411 CXA1127M
IC602 µPD7508G QUARTZ DATE MI-COM
IC605 RH5RA50A
IC601 CXP80116 MAIN MI-COM
IC441 CXA1204Q
IC431 CX20114
IC604 LVC556L
IC608 (1/2) NJM2904M
IC608 (2/2) NJM2904M
Q620 DTA144EK INVERT
Q603 DTA144TK QD-STB ON
Q625 DTC144EK POWER ON DET.
Q623 DTC143EK INV.AMP
Q624 DTC114EK INV.AMP
Q611 2SA1213 5V DRIVE
Q615 DTC144EK FADE ON
Q411 DTC144EK CAP-ON SW
Q404 2SA1213 PWM DRIVE
Q403 DTC114EK PWM SW
Q401 DTC114EK PWM SW
X801 SMO383
X441 5.68M
VR401 ATF BIAS
VR601 SS5V
VR603 PG
TP410 HEAD SWPULSE
TP601 5V
TP402 TP401
TP404 ATF-E
TP603 SS5V
TP406 D-PG
SEL 2
CAPSTAN ON (L)
CAPSTAN FWD (H)
C-PWM
D-PWM
SEL 1
SS 5V
REC ATF
RF PB (H)
D-FG
D-PG
C-FG
DEW (H)
UN-LOADING (H)
LOADING (H)
DRUM FWD (L)
FADE
CAMERA FADE
SEL1
HEAD SW PULSE
AV PB (H)
JOG
A-MUTE (H)
V-MUTE (H)
LINE IN (L)
DRUM FWD (L)
DRUM ON (L)
CAPSTAN FWD (H)
K-STROBE
QD-STROBE
TALLY
POWER LED
SW PULSE 1
SW PULSE 2
BOT (L)
EOT (L)
MODE SW 3
MODE SW 2
MODE SW 1
V-STROBE
CQ-STROBE
SP (H)
FADE (H)
C-FG
D-FG
D-PG
ATF LOCK (L)
C-SYNC
SAFETY TAB (H)
CASSETTE DOWN (L)
SEL (A)
ATF ERROR
SW. POSITION ADJ.
R-KEY
STILL ADJ.
S-REEL FG
T-REEL FG
DEW (H)
BATT.
CLOCK 1
VC-DATA OUT
MATRIX
LEVEL SHIFT
LIMIT
BRAKE
HALL POWER
FWD/RVS
REF. V
CONSTANT CURRENT
ROTATION DIRECTION
POSITION SIG. PROCESS
START
CL DET
OVER CURRENT DET
POWER OF
OSC
REGULATE CONT.
EXT BIAS DRIVE
FH BPF
3FH BPF
PB/REC
AGC
S/H B
SCHMITT
S/H A
VREF
V.SCF REF
1/N
1/4
1/26
ROTATION SW
IC602 IC605 IC601 IC604 IC441 IC608 (2/2) IC608 (1/2) IC411 IC431


RECORDER-KEY C.B.A.
CN001
Q002 DTC114EK LED DRIVE
Q001 DTC114EK LED DRIVE
LED002 GL1HD51
LED001 GL1HD51
SW001 EJECT
SW002 (−)
SW003 MODE
SW004 (+)
SW005 SHIFT
SW006 POWER
SW007 STOP
SW008 PLAY
SW009 FF
SW010 REW
SW011 PAUSE
SW012 REC
SW013 COUNTER RESET
SW014 TAPE RETURN
SW015 SELF/INT
SW016 SP/LP
※JP001 OPEN: JPN, SECAM SHORT: USA, PAL
IC411 CXA1127M
MATRIX
LEVEL SHIFT
LIMIT
BRAKE
HALL POWER
FWD/RVS
REF. V
IC412 CX20115A
REF.V
LEVEL SHIFT
CN411
TO CAPSTAN MOTOR
CN431
TO DRUM MOTOR
CN401
TO DRUM MOTOR
CN607
LOAD. MTR (+)
LOAD. MTR (−)
TO LOADING MOTOR
CN608
DEW (H)
GND
TO DEW SENSOR
IC441 CXA1204Q
IC431 CX20114
CONSTANT CURRENT
ROTATION DIRECTION
BRAKE
START
CL DET
POSITION SIGNAL PROCESS
OVER CURRENT DET
POWER OFF
OSC
IC603 LB1631M
DRIVE
Q431 2SA1162G STARTER
Q404 2SA1213 PWM DRIVE
Q402 2SA1213 PWM DRIVE
Q403 DTC114EK PWM SW
Q401 DTC114EK PWM SW
Q411 DTA144EK CAP-ON SW
Q432 IMD2 ROTATION/DRUM ON SW
IC604 LVC556L
EXT BIAS DRIVE
Q615 DTC144EK FADE ON
IC608 (2/2) NJM2904M
IC608 (1/2) NJM2904M
TP402 TP401 TP404 ATF-E TP603 S55V
TP405 C-FG TP406 D-PG TP407 D-FG
SEL 2
CAPSTAN ON
CAPSTAN FWD
C-PWM
D-PWM
SEL 1
S5 5V
REC ATF
RF PB
D-FG
D-PG
C-FG
UNREG 5V
S55V
DEW (H)
UN-LOADING
LOADING
DRUM FWD
FADE
CAMERA FADE
C604
IC441
IC608 (2/2)
IC608 (1/2)
IC411 IC431
IC412 IC603

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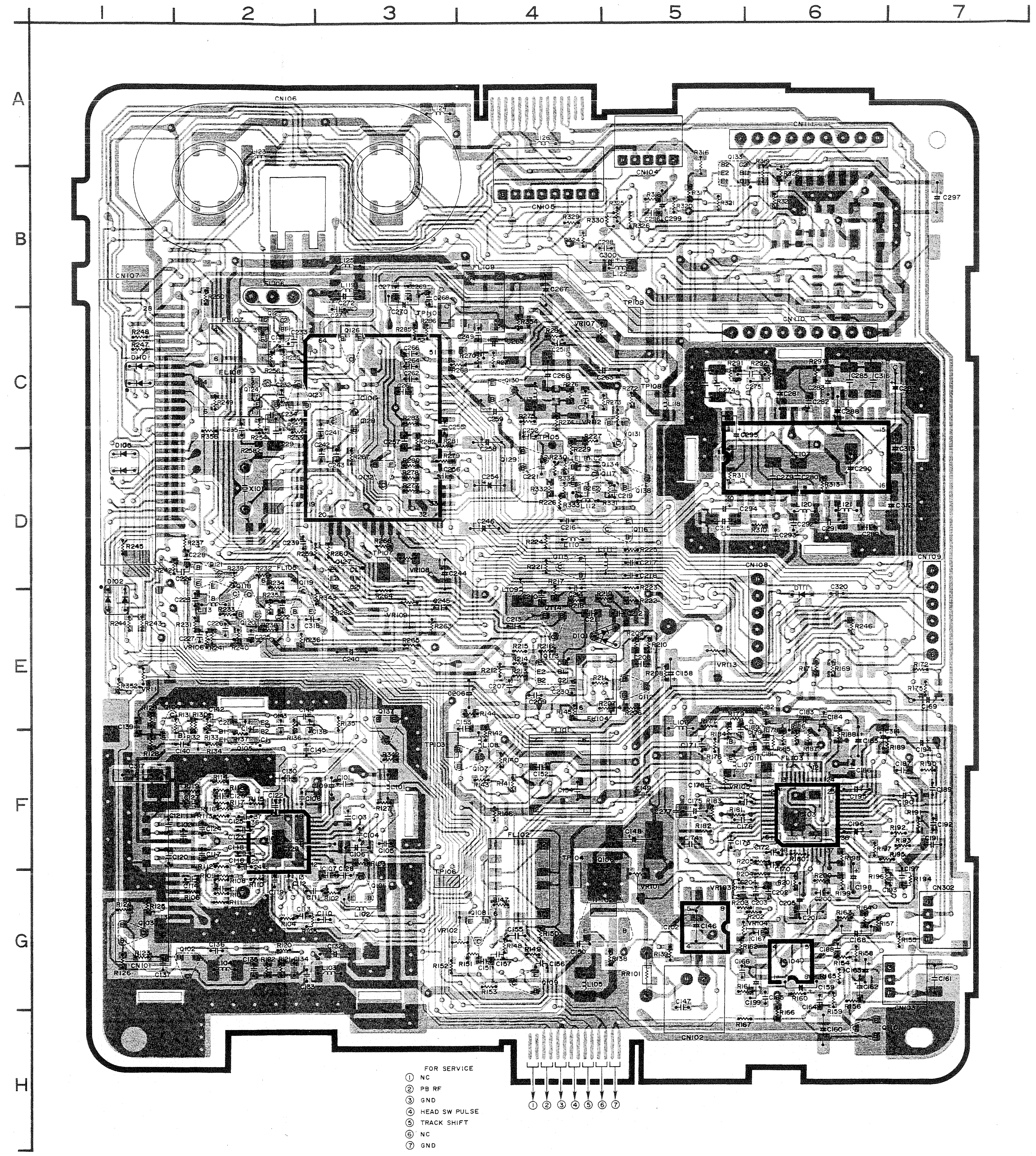
CIRCUIT BOARD DIAGRAM VIDEO C.B.A.

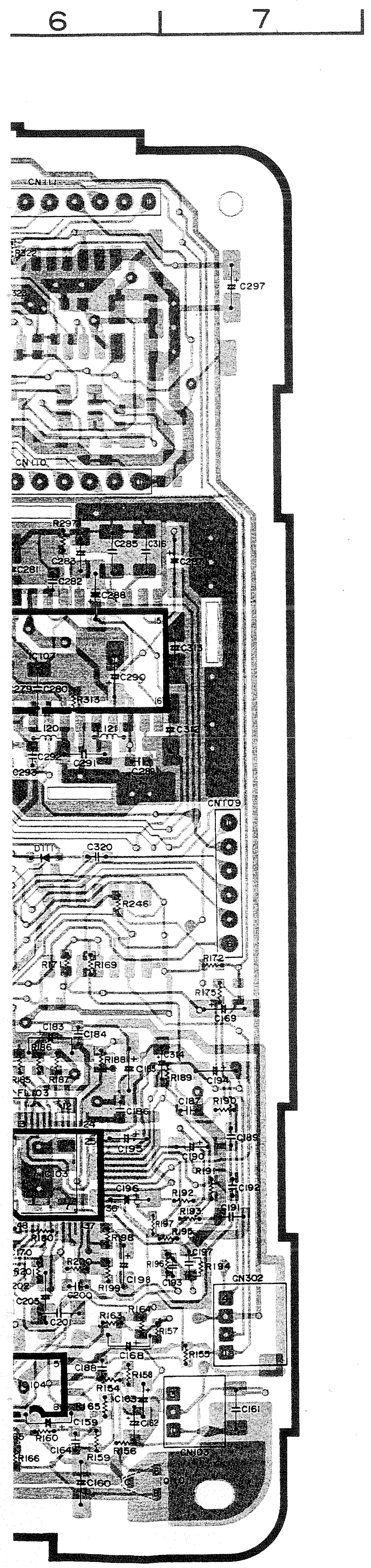
VIDEO C.B.A.
(COMPONENT SIDE)

D101	E−5
D102	E−1
D105	D−1
D110	C−1
IC101	F−2
IC102	G−5
IC103	F−6
IC104	G−6
IC106	C−3
IC107	C−6
Q101	G−3
Q102	G−2
Q103	G−1
Q104	E−2
Q105	F−2
Q106	G−4
Q107	F−4
Q108	G−4
Q109	G−4
Q110	H−6
Q111	F−5
Q112	E−5
Q113	E−4
Q114	E−4
Q115	D−4
Q116	D−5
Q117	D−4
Q118	E−2
Q119	E−2
Q120	E−2
Q121	D−2
Q123	C−2
Q124	C−2
Q125	C−2
Q126	C−3
Q127	D−3
Q128	C−3
Q129	D−4
Q130	C−4
Q131	C−5
Q132	D−3
Q133	B−5
Q134	D−4
Q137	F−3
Q138	D−5


1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
CN106
CN107
CN104
CN105
CN110
CN108
CN109
CN102
CN101
CN302
FOR SERVICE
① NC
② PB RF
③ GND
④ HEAD SW PULSE
⑤ TRACK SHIFT
⑥ NC
⑦ GND
① ② ③ ④ ⑤ ⑥ ⑦

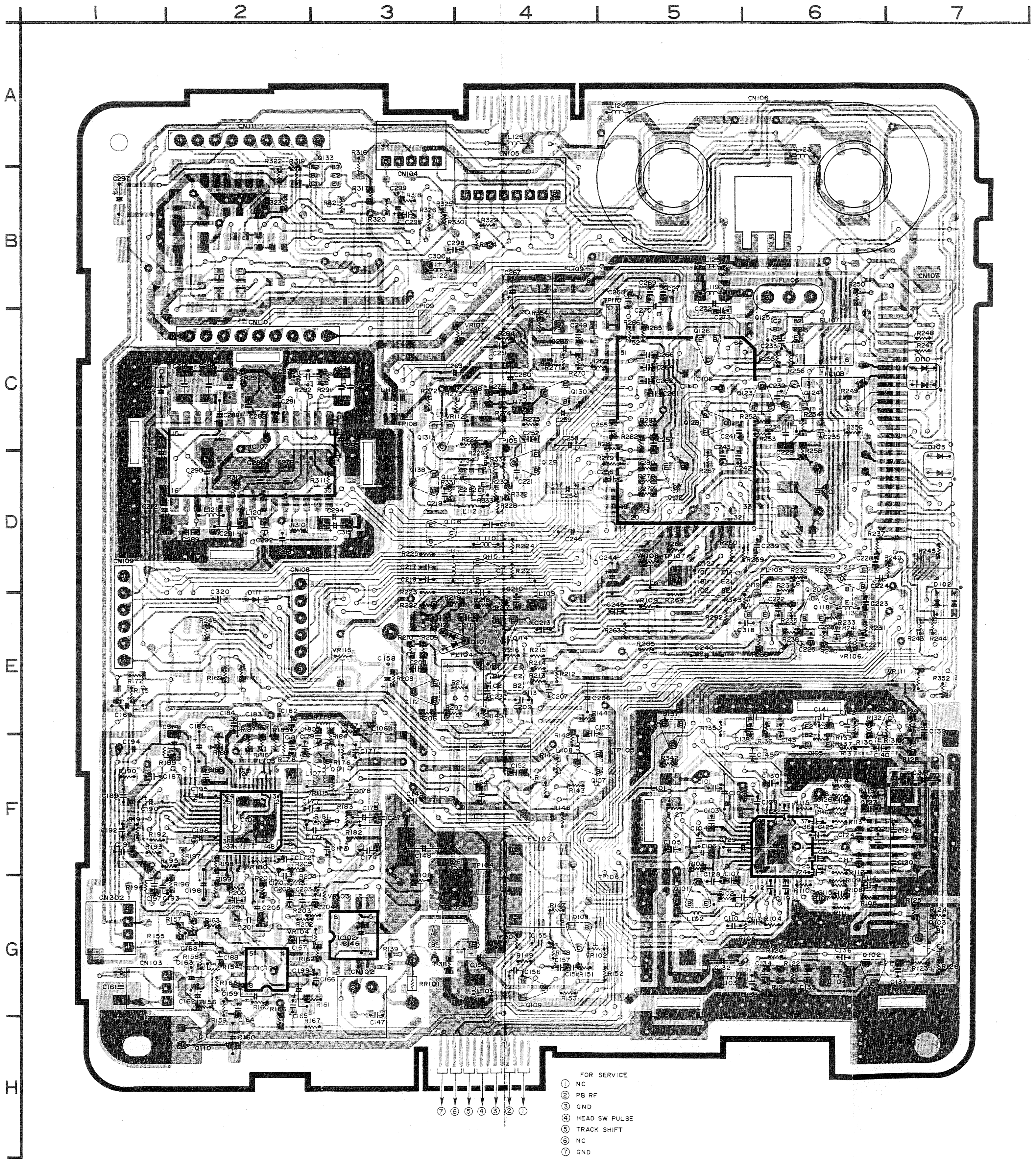
VIDEO C.B.A.
(SOLDERING SIDE)

D101	E−4
D102	D−7
D105	D−7
D110	C−7
IC101	F−6
IC102	G−3
IC103	F−2
IC104	G−2
IC106	C−5
IC107	D−2
Q101	G−5
Q102	G−7
Q103	G−7
Q104	E−7
Q105	F−6
Q106	G−3
Q107	F−4
Q108	G−4
Q109	G−4
Q110	H−2
Q111	F−3
Q112	E−3
Q113	E−4
Q114	E−4
Q115	D−4
Q116	D−3
Q117	D−4
Q118	E−6
Q119	E−6
Q120	E−6
Q121	D−6
Q123	C−6
Q124	C−6
Q125	C−6
Q126	C−5
Q127	D−5
Q128	C−5
Q129	D−4
Q130	C−4
Q131	C−3
Q132	D−5
Q133	B−3
Q134	D−4
Q137	E−5
Q138	D−3



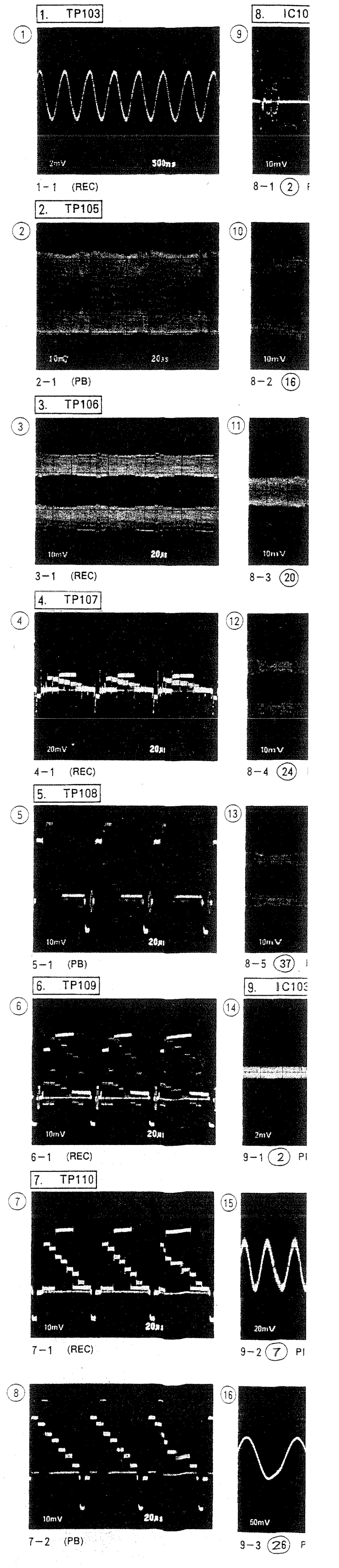
VIDEO C.B.A.
(SOLDERING SIDE)

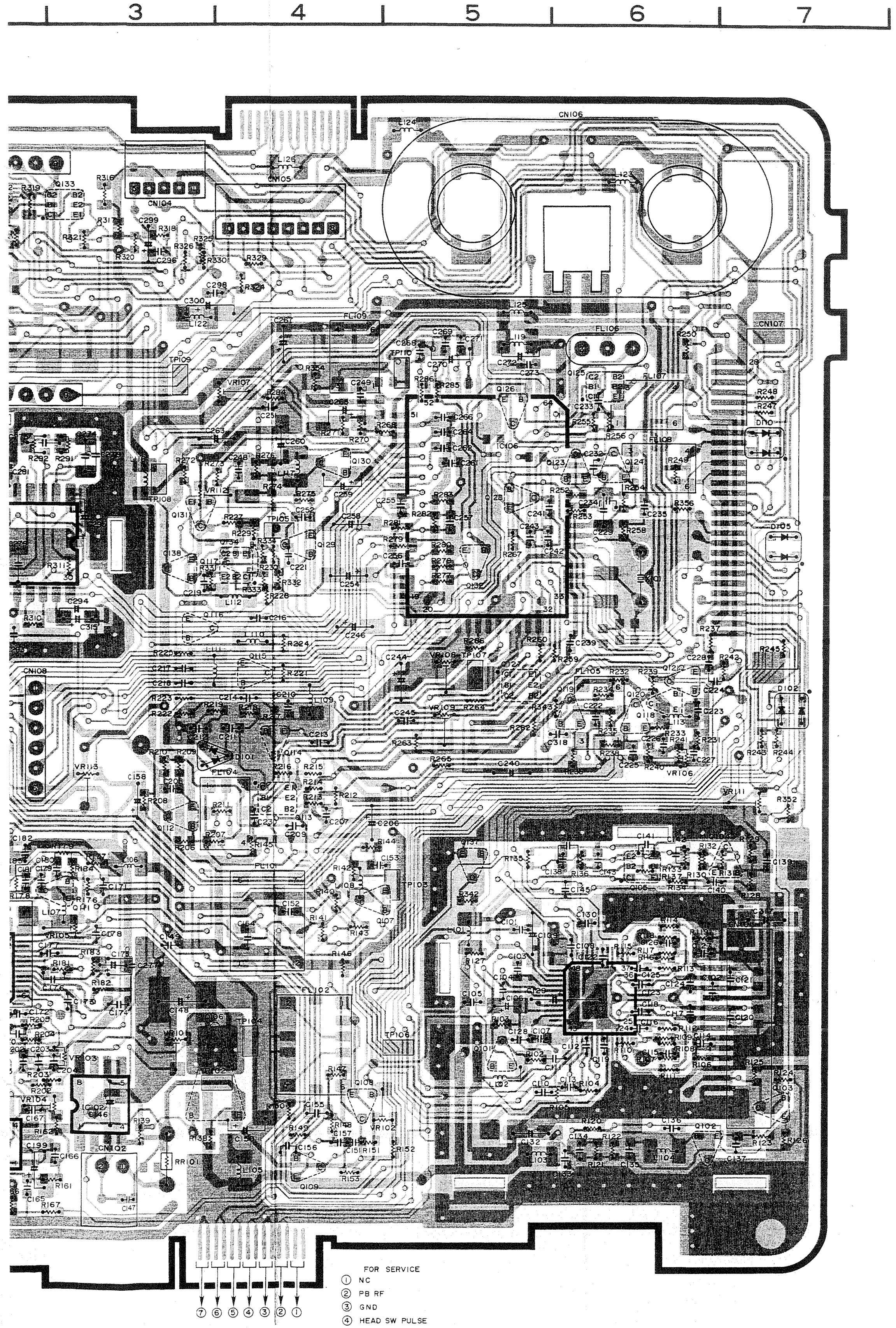
D101	E-4
D102	D-7
D105	D-7
D110	C-7
IC101	F-6
IC102	G-3
IC103	F-2
IC104	G-2
IC106	C-5
IC107	D-2
Q101	G-5
Q102	G-7
Q103	G-7
Q104	E-7
Q105	F-6
Q106	G-3
Q107	F-4
Q108	G-4
Q109	G-4
Q110	H-2
Q111	F-3
Q112	E-3
Q113	E-4
Q114	E-4
Q115	D-4
Q116	D-3
Q117	D-4
Q118	E-6
Q119	E-6
Q120	E-6
Q121	D-6
Q123	C-6
Q124	C-6
Q125	C-6
Q126	C-5
Q127	D-5
Q128	C-5
Q129	D-4
Q130	C-4
Q131	C-3
Q132	D-5
Q133	B-3
Q134	D-4
Q137	E-5
Q138	D-3


1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
CN106
CN111
CN104
CN110
CN107
CN109
CN108
CN302
CN103
CN102
⑦ ⑥ ⑤ ④ ③ ② ①

FOR SERVICE
① NC
② PB RF
③ GND
④ HEAD SW PULSE
⑤ TRACK SHIFT
⑥ NC
⑦ GND

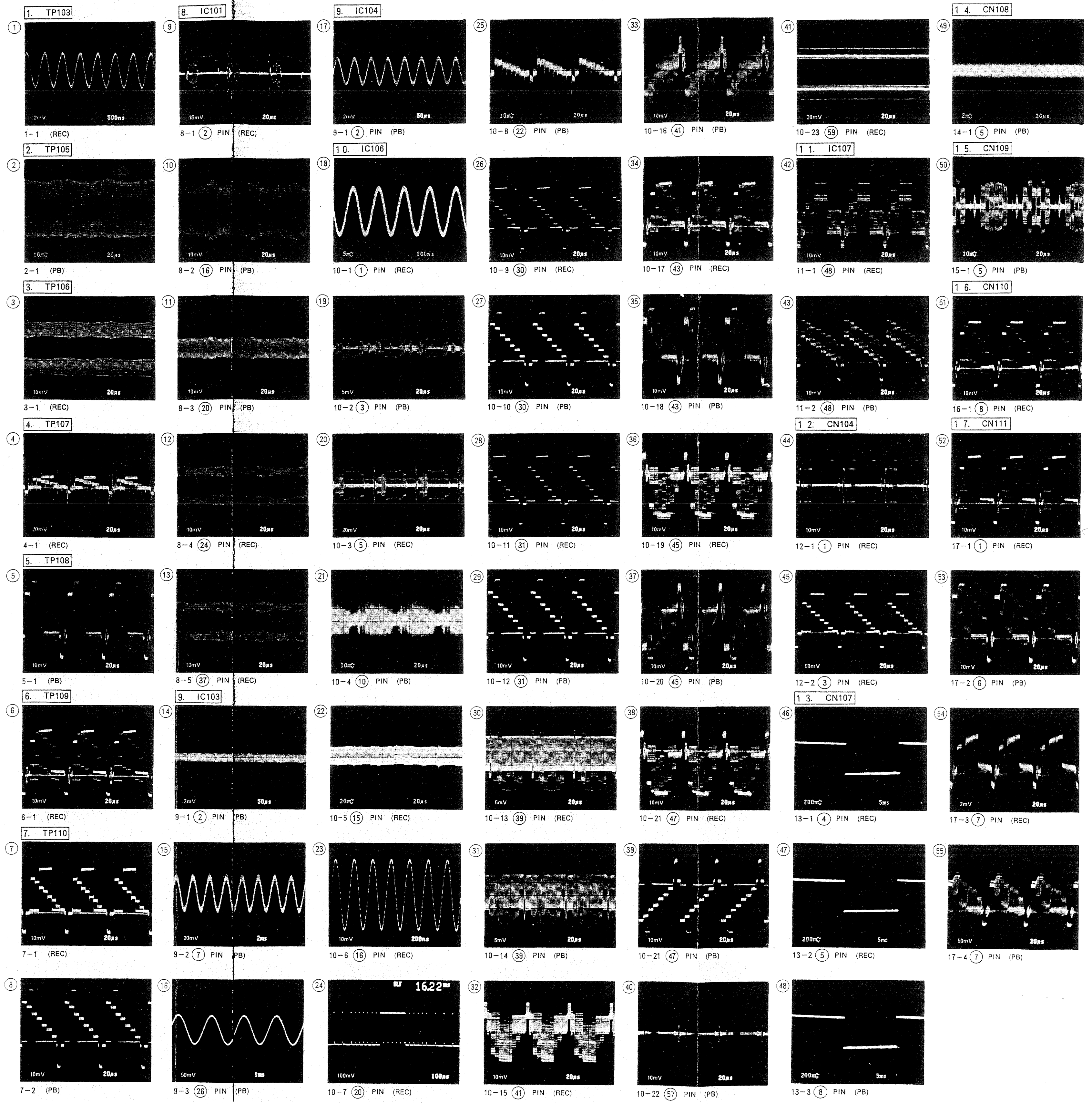
SIGNAL WAV





FOR SERVICE
① NC
② PB RF
③ GND
④ HEAD SW PULSE
⑤ TRACK SHIFT
⑥ NC
⑦ GND

SIGNAL WAVEFORMS



1. TP103
① 1−1 (REC)

2. TP105
② 2−1 (PB)

3. TP106
③ 3−1 (REC)

4. TP107
④ 4−1 (REC)

5. TP108
⑤ 5−1 (PB)

6. TP109
⑥ 6−1 (REC)

7. TP110
⑦ 7−1 (REC)
⑧ 7−2 (PB)

8. IC101
⑨ 8−1 ② PIN (REC)
⑩ 8−2 ⑯ PIN (PB)
⑪ 8−3 ⑳ PIN (PB)
⑫ 8−4 ㉔ PIN (REC)
⑬ 8−5 ㊲ PIN (REC)

9. IC103
⑭ 9−1 ② PIN (PB)
⑮ 9−2 ⑦ PIN (PB)
⑯ 9−3 ㉖ PIN (PB)

9. IC104
⑰ 9−1 ② PIN (PB)

10. IC106
⑱ 10−1 ① PIN (REC)
⑲ 10−2 ③ PIN (PB)
⑳ 10−3 ⑤ PIN (REC)
㉑ 10−4 ⑩ PIN (PB)
㉒ 10−5 ⑮ PIN (REC)
㉓ 10−6 ⑯ PIN (REC)
㉔ 10−7 ⑳ PIN (REC)
㉕ 10−8 ㉒ PIN (PB)
㉖ 10−9 ㉚ PIN (REC)
㉗ 10−10 ㉚ PIN (PB)
㉘ 10−11 ㉛ PIN (REC)
㉙ 10−12 ㉛ PIN (PB)
㉚ 10−13 ㊴ PIN (REC)
㉛ 10−14 ㊴ PIN (PB)
㉜ 10−15 ㊶ PIN (REC)
㉝ 10−16 ㊶ PIN (PB)
㉞ 10−17 ㊸ PIN (REC)
㉟ 10−18 ㊸ PIN (PB)
㊱ 10−19 ㊺ PIN (REC)
㊲ 10−20 ㊺ PIN (PB)
㊳ 10−21 ㊼ PIN (REC)
㊴ 10−21 ㊼ PIN (PB)
㊵ 10−22 (57) PIN (PB)
㊶ 10−23 (59) PIN (REC)

11. IC107
㊷ 11−1 ㊽ PIN (REC)
㊸ 11−2 ㊽ PIN (PB)

12. CN104
㊹ 12−1 ① PIN (REC)
㊺ 12−2 ③ PIN (REC)

13. CN107
㊻ 13−1 ④ PIN (REC)
㊼ 13−2 ⑤ PIN (REC)
㊽ 13−3 ⑧ PIN (PB)

14. CN108
㊾ 14−1 ⑤ PIN (PB)

15. CN109
㊿ 15−1 ⑤ PIN (PB)

16. CN110
(51) 16−1 ⑧ PIN (REC)

17. CN111
(52) 17−1 ① PIN (REC)
(53) 17−2 ⑥ PIN (PB)
(54) 17−3 ⑦ PIN (REC)
(55) 17−4 ⑦ PIN (PB)

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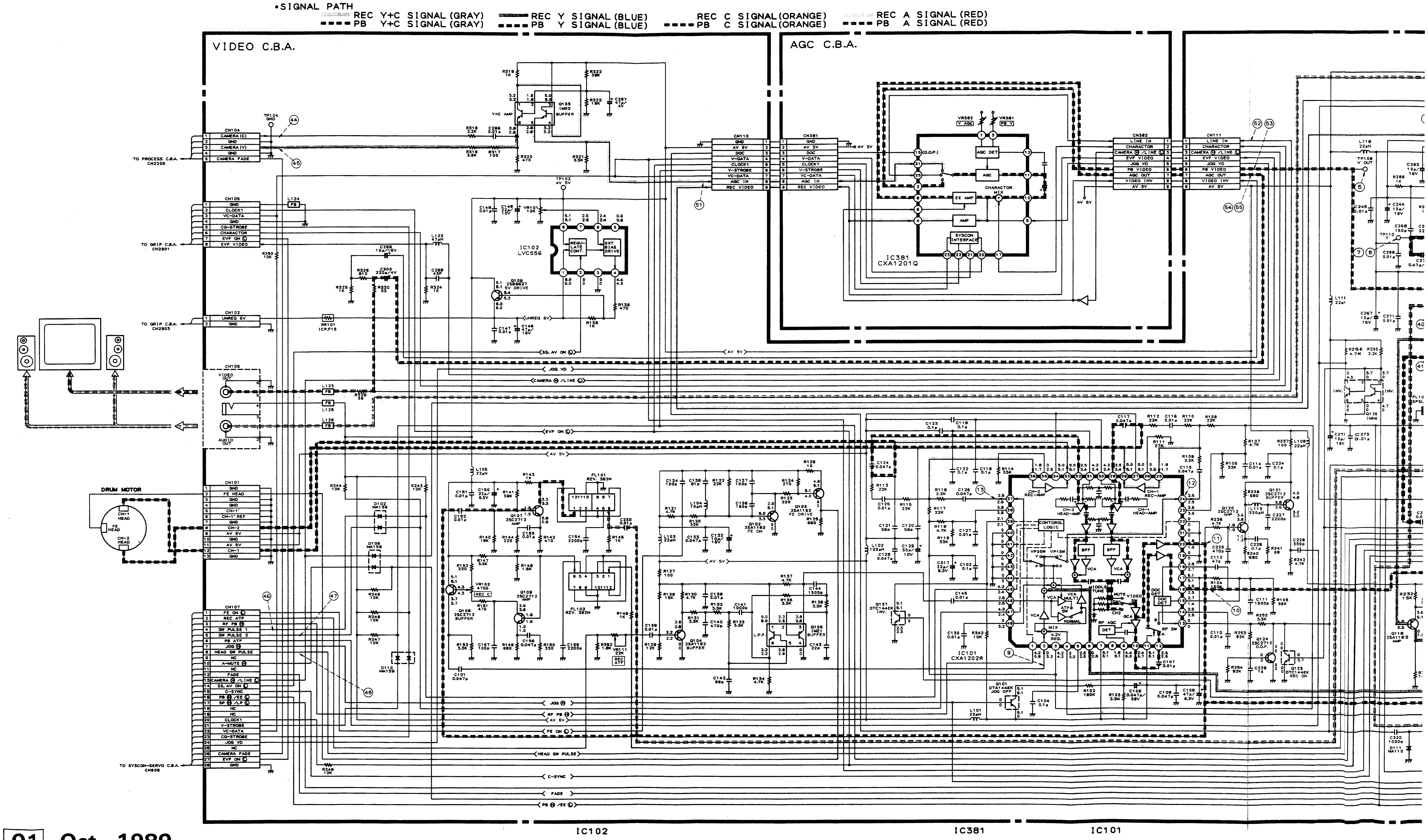
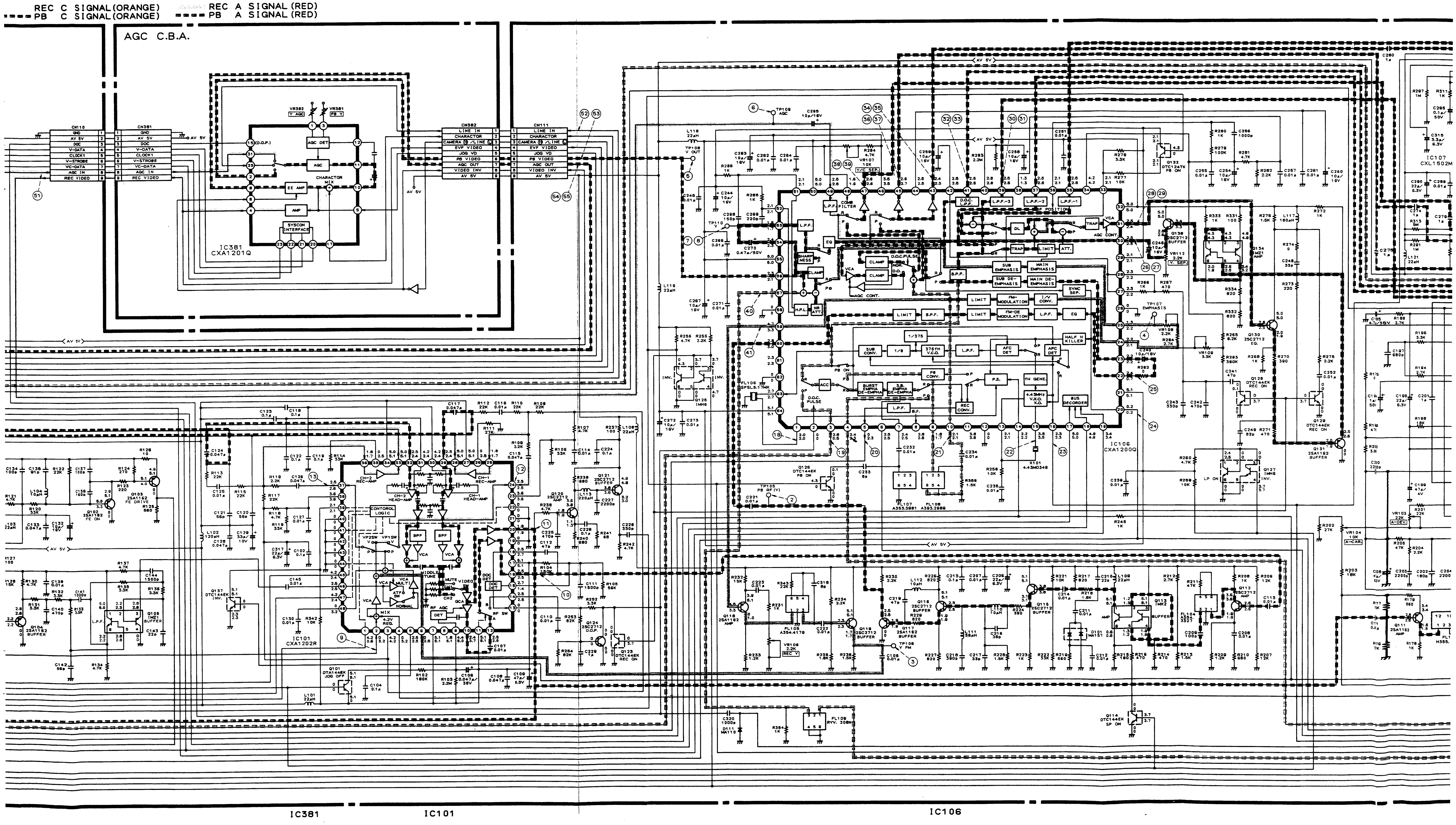
SCHEMATIC DIAGRAM VIDEO C.B.A.

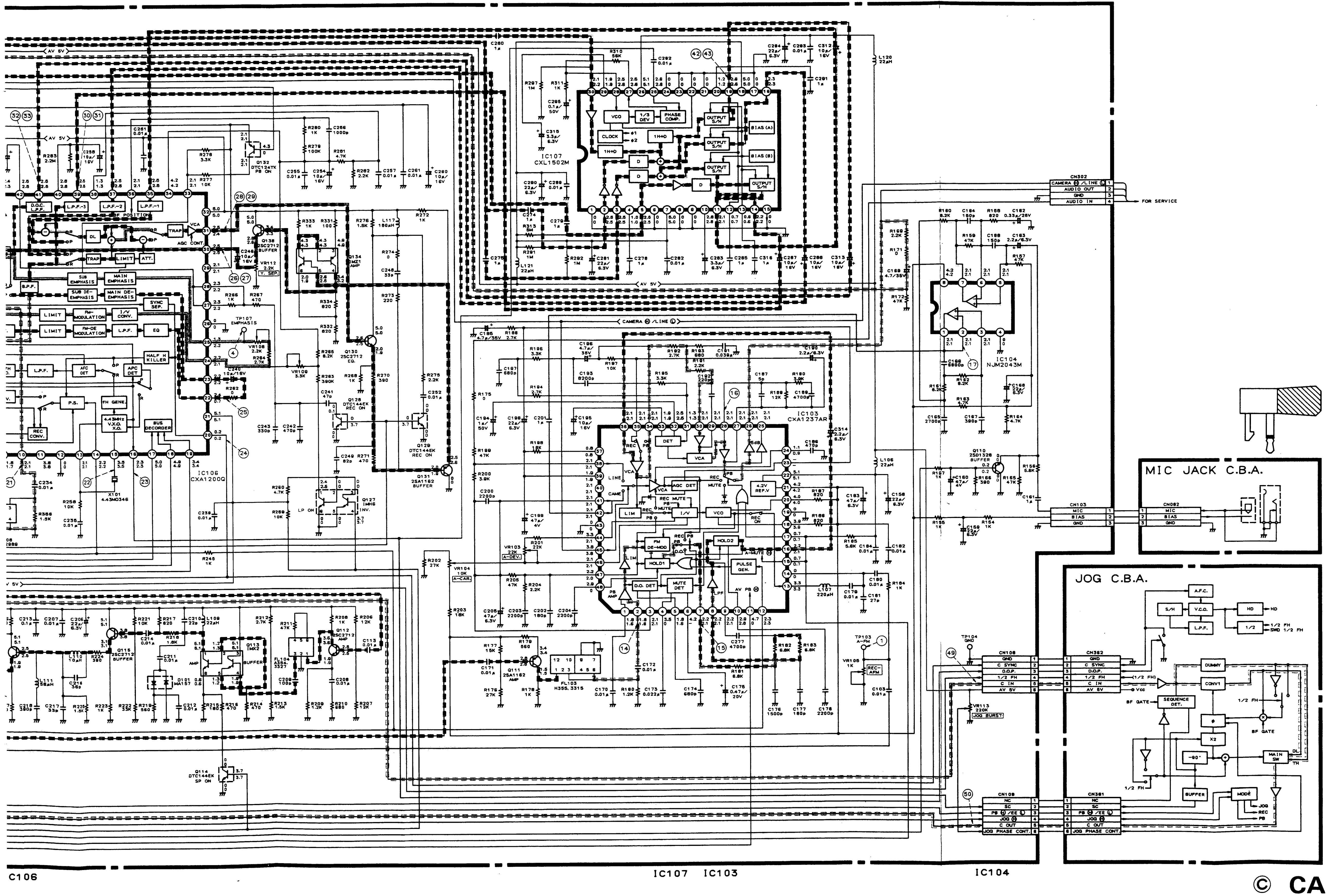

•SIGNAL PATH
REC Y+C SIGNAL (GRAY)
PB Y+C SIGNAL (GRAY)
REC Y SIGNAL (BLUE)
PB Y SIGNAL (BLUE)
REC C SIGNAL (ORANGE)
PB C SIGNAL (ORANGE)
REC A SIGNAL (RED)
PB A SIGNAL (RED)
VIDEO C.B.A.
AGC C.B.A.
TO PROCESS C.B.A. CN2205
TO GRIP C.B.A. CN2901
TO GRIP C.B.A. CN2903
TO SYSCON-SERVO C.B.A. CN808
CN104
CN105
CN102
CN106
CN101
CN107
CN110
CN381
CN382
CN111
DRUM MOTOR
VIDEO OUT
AUDIO OUT
IC102 LVC556
IC381 CXA1201Q
IC101 CXA1202R
Q133 IMX2 BUFFER
FL101 RZV. 362N
FL102 RZV. 362N
IC102
IC381
IC101

01 Oct. 1989

VIDE-V05494 / Druck 31


REC C SIGNAL(ORANGE)
PB C SIGNAL(ORANGE)
REC A SIGNAL (RED)
PB A SIGNAL (RED)

AGC C.B.A.
CN110
CN381
CN382
CN111
IC381
CXA1201Q
VR382 Y AGC
VR381 PB Y
AGC DET
AGC
CHARACTOR MIX
EE AMP
AMP
SYSCON INTERFACE
GND
AV 5V
DOC
V-DATA
CLOCK1
V-STROBE
VC-DATA
AGC IN
REC VIDEO
LINE IN
CHARACTOR
CAMERA / LINE
EVF VIDEO
JOG VD
PB VIDEO
AGC OUT
VIDEO INV
AV 5V
IC101
CXA1202R
CH-2 REC-AMP
CH-1 REC-AMP
CH-2 HEAD-AMP
CH-1 HEAD-AMP
CONTOROL LOGIC
BPF
VCA
MIX
4.2V REG.
MIDDLE TUNE
MUTE
DOC DET
RF AGC
SW
Q101 DTA144EK JOG OFF
Q102 2SA1162 FE ON
Q103 2SA1162 FE DRIVE
Q104 2SA1162 BUFFER
Q105 IMZ1 BUFFER
Q137 DTC144EK INV.
Q120 2SC2712 AMP
Q121 2SC2712 BUFFER
Q123 DTC144EK REC ON
Q124 2SC2712 D.O.P.
IC106
CXA1200Q
L.P.F.
COMB FILTER
SHARPNESS
CLAMP
EQ
H.P.L.
NR ATT.
D.O.C.PULSE
NOR. D.O.
AGC CONT.
D.O.C. L.P.F.
L.P.F.-3
L.P.F.-2
L.P.F.-1
POSITION
DL
TRAP
LIMIT
ATT.
VCA
SUB EMPHASIS
MAIN EMPHASIS
SUB DE-EMPHASIS
MAIN DE-EMPHASIS
B.P.F.
FM-MODULATION
FM-DE MODULATION
I/V CONV.
SYNC SEP.
HALF H KILLER
1/375
1/8
3761H V.C.O.
AFC DET
APC DET
SUB CONV.
PB CONV.
ACC
BURST EMPHA DE-EMPHA
S.B. EMPHA DE-EMPHA
P.S.
fH GENE.
4.43MHz V.X.O.
REC CONV.
BUS DECORDER
X101 4.43MO34S
FL106 SFSL5.17MX
FL107 A353.3981
FL108 A393.2989
FL105 A354.4179
FL104 A354.3327
FL109 RYV. 308N
VR107 Y/C SEP.
VR108 EMPHASIS
VR112 Y SEP.
VR106 REC Y
VR103 A-DEV.
VR104 A-CAR.
TP108 V OUT
TP109 AGC
TP110 Y
TP105 PB RF (Y)
TP106 Y FM
TP107 EMPHASIS
Q125 IMH6 INV.
Q126 DTC144EK PB ON
Q127 IMH6 INV.
Q128 DTC144EK REC ON
Q129 DTC144EK REC ON
Q130 2SC2712 EQ.
Q131 2SA1162 BUFFER
Q132 DTC124TK PB ON
Q133 2SC2712 BUFFER
Q134 IMZ1 AMP
Q111 2SA1162 AMP
Q112 2SC2712 AMP
Q113 IMZ1 BUFFER
Q114 DTC144EK SP ON
Q115 2SC2712 BUFFER
Q116 2SA1162 AMP
Q117 2SA1162 BUFFER
Q118 2SC2712 BUFFER
Q119 2SC2712 BUFFER
D101 MA157
D111 MA110
IC107 CXL1502M
AV 5V
IC381
IC101
IC106


IC106
CXA1200Q
IC107
CXL1502M
IC103
CXA1237AR
IC104
NJM2043M
CN302
CAMERA ⊕ /LINE ⊖
AUDIO OUT
GND
AUDIO IN
FOR SERVICE
MIC JACK C.B.A.
CN103
CN082
MIC
BIAS
GND
JOG C.B.A.
CN108
CN362
CN109
CN361
C SYNC
D.O.P.
1/2 FH
C IN
AV 5V
NC
SC
JOG PHASE CONT.
C OUT
A.F.C.
V.C.O.
S/H
L.P.F.
HD
SEQUENCE DET.
DUMMY
CONV1
MAIN SW
BUFFER
MODE
AV 5V
CAMERA ⊕ /LINE ⊖
C106
IC107 IC103
IC104

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Supplement

During the production, some adjustments, part Nos., descriptions in the Service Manual were revised. The all revisions have been informed on the Service Manual Reports periodically, and this Supplement is composed of them.

SERVICE MANUAL REPORT INDEX

SMR NO.	DATE	MODEL	NO. TITLE
AD-367P.S	'89.10	E640E/F	1. Classification No. 2. UL Tape Addition (VIDEO C.B.A.) 3. AF C.B.A. Change 4. Parts Control Information
AD-377P.S	'89.11	E640E/F	1. Main Microcomputer Change 2. Repair Instruction Correction (ATF Bias Adjustment) 3. Parts Catalog Correction (JOG C.B.A.) 4. Parts Control Information
AD-388P.S	'90. 1	E640E/F	1. Main Microcomputer IC601 Change 2. Classification No. Change 3. AF C.B.A. Change 4. Camera Key (1) C.B.A. Change 5. Parts Control Information
AD-397P.S	'90. 3	E640E/F	1. Main Microcomputer IC601 Change 2. GRIP C.B.A. Change 3. Classification No. on AD-388 4. Parts Control Information
AD-408N.P.S	'90. 7	MC-4B	1. Drive Gear Change 2. Parts Control Information
AD-422N.P. F-PAL	'90. 9	MC-4B MC-4C	1. New Service Part Addition 2. Coaster, Right Change 3. Parts Control Information
AD-432P. F-PAL	'90.10	MC-4B	1. Remedy for Reel Motor Error
AD-441N.P. F-PAL	'90.11	MC-4B	1. New Service Parts 2. Parts Control Information

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-1 New service parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2956-000	C	1	SCREW
DY4-2957-000	C	1	BASE, DRUM
DY4-2958-000	C	1	BASE, DRUM

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-454P·F-PAL
1/1

Date December 20, 1990

Canon A1E/F , A1HiE/F

PAL

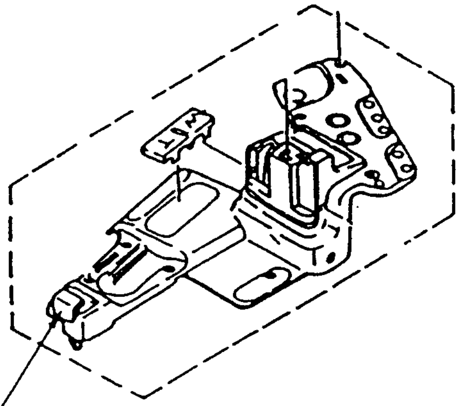
F-PAL

1. Addition of White Balance Sensor Window
2. Parts Control Information

1. Addition of White Balance Sensor Window

1-1 Addition

For the request from the market, the following part has been added.



Added
DA1-2196-000 (WINDOW, WB SENSOR)

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts : N/A

2-3 New service part

PART NO.	CLASS	Q'TY.	DESCRIPTION
DA1-2196-000	B	1	WINDOW, WB SENSOR

Canon VIDEO SERVICE MANUAL REPORT

Technical Service Department, Canon Inc.

Report No. AD-441N·P·F-PAL
1/2
Date November 20, 1990

Canon MC – 4B

NTSC
PAL
F-PAL

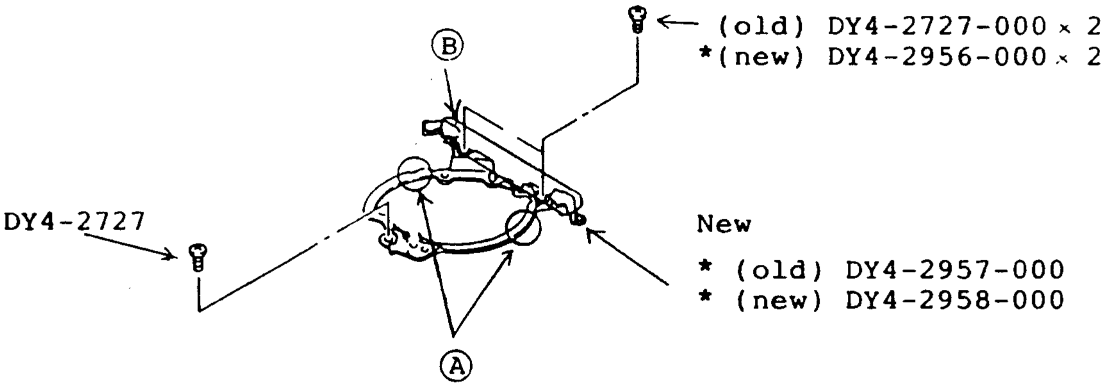
1. New Service Parts
2. Parts Control Information

1. New Service Parts

1-1 Addition

For the market request, two types (old and new) of drum base and a screw for the new type have been established as new service parts.

* indicated parts are newly established.



Remarks for the new type drum base :

Ⓐ parts are convex to match with the concave parts of mechanical chassis.
Ⓑ part is thicker than the old type.

1-2 Repair information

The MC-4B which has been manufactured around May, 1989 has the both types (old and new) of drum base, mechanical chassis and screw.
As they do not have an interchangeabilities each other, check the difference of shape when replacing.

Drum Base	Old	New
	↕	↕
Mechanical Chassis	Old	New

Canon © **VIDEO SERVICE MANUAL REPORT**
Technical Service Department, Canon Inc.

Report No. AD－432P·F－PAL
1/1
Date October 20,1990

Canon MC－4B

PAL

F－PAL

·Remedy for Reel Motor Error

Due to the variation of mechanism loading and the driving system of loading motor, the loading motor may be sometimes driven forward and backward repeatedly at ejecting. To repair this, perform the following measure.

1. Affected models :

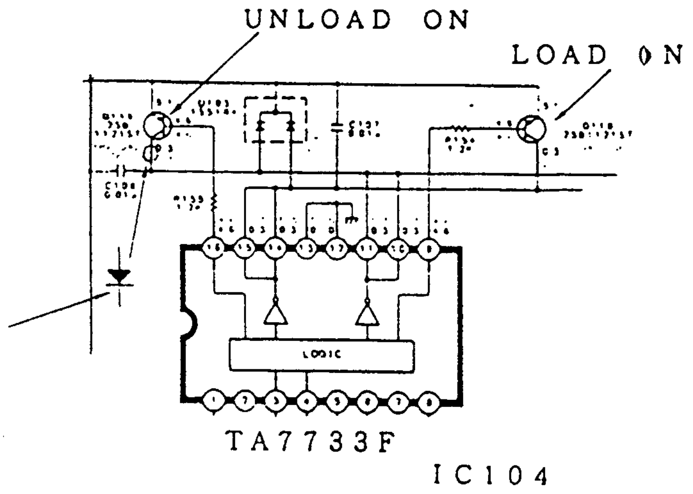
E80E,F E808E,F A1E,F

*Remarks : From the A1HiE,F, the MC－4C has been mounted instead of the MC－4B. The symptom will not occur because the MC－4C adopts the pulse driving method.

3. Remedy

Check the MC－4B of above symptom (Not－ejectable) if its loading motor moves forward and backward repeatedly, by repeating loading/unloading without the tape.

If the symptom occurs, add a diode to the connector of transistor (which turned on at unloading) to decrease the driving voltage at unloading. (Cut a pattern partly.)



Y22－2052－000 is added.

Canon VIDEO SERVICE MANUAL REPORT

©

Technical Service Department, Canon Inc.

Report No. AD－422N·P·
F－PAL 1/2

Date September,20,1990

Canon MC－4B,MC－4C

1. New Service Part Addition
2. Coaster, Right Change
3. Parts Control Information

NTSC

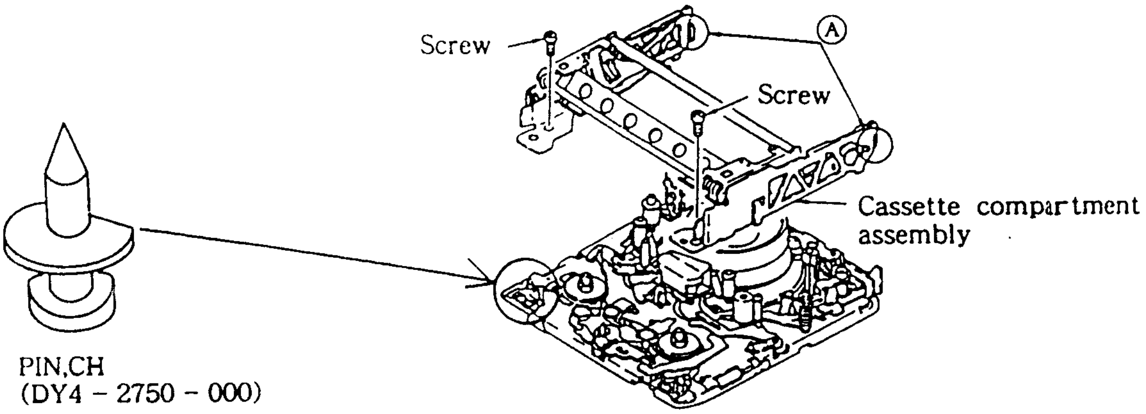
PAL

F-PAL

1. New Service Part Addition

1－1 Addition

The following positioning pin is added as a new service part for a cassette housing (S－side).



1－2 Repair information

·How to use the positionig pin

1) Dismount the C.B.A.S and cassettecompartment.

2) Cut off “”>——< ” indicated part (three points) in the figure.

3) Face the cut－off part toward a side of loading motor.
Then, push it until it touches the depression of mechanical chassis completely. (Fig.b)

4) Confirm the position of it, and secure with the Alonalpha or equivalent. (Fig.c)

5) Check the tape transport.

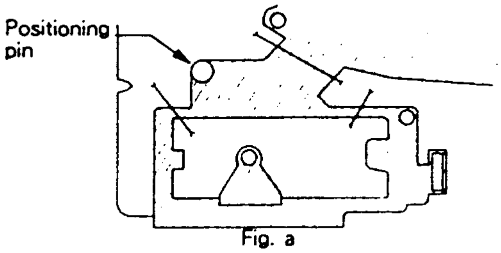


Fig. a

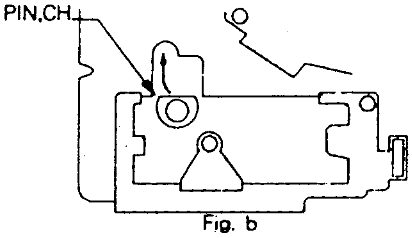


Fig. b

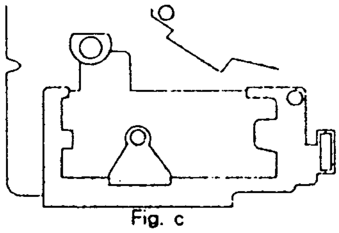


Fig. c

3.Parts Control Information

3 — 1 Deleted/Changed parts: N/A

3 — 2 New service part

PART No.	CLASS	Q'TY	DESCRIPTION
DY4 — 2750 — 000	C	1	PIN, CH

2) **As a remedy for distortion on picture of EVF screen caused by a faulty of horizontal lineality, the following constants have been changed.**

C2913	39 μF/10V	→	82 μF/10V	(VC6-4290-826)
Q2904	2SD968A	→	2SD968A-S	(WA2-5151-000)

2-2 Classification :

1) E640E ; Changed from 05.
   E640F ; N/A (production discontinued)

2) Not changed

2-3 Repair Information

GRIP C.B.A. (DG1-0930-000)

3. Classification No. on AD-388

3-1 Information

The classification No. of main microcomputer IC601 on AD-388 is established as follows.

- Classification : E640F ; Changed from 03.

4. Parts Control Information

4-1 Deleted parts : N/A

4-2 Changed parts :

DG1-0912-000	New only stocked.
DG1-0930-000	New only added after old stock depletion.
DH4-0207-000	New only stocked.

4-3 New Service Parts :

PART NO.	CLASS	Q'TY.	DESCRIPTION
VC6-4290-826 000	C	1	CAPACITOR, ELE. 82 μF/10V
VR5-2770-105 000	C	1	RESISTOR 1 MΩ
WA2-5151-000 000	B	1	TRANSISTOR, 2SD968A-S

Canon VIDEO SERVICE MANUAL REPORT
©
Technical Service Department, Canon Inc.

Report No. AD-408N・P・S
1/1
Date July 20, 1990

Canon MC-4B

NTSC
PAL
F・PAL

1. Drive Gear Change
2. Parts Control Information

1. Drive Gear Change

1-1 Change

From the H800 series, the MC-4C has been mounted instead of the MC-4B. With this change, the following parts are changed. (consolidated with the parts for the MC-4C)

Old		New
DY4-2667 (White)	→	DY4-2742 (Yellow)
DY4-2668 (Blue)	→	DY4-2743 (Green)

1-2 Classification : N/A

1-3 Interchangeability :

- For the MC-4B, both types (old and new) can be used.
- For the MC-4C, the new type only can be used.

2. Parts Control Information

2-1 Deleted parts : N/A

2-2 Changed parts :

DY4-2667	Deleted after old stock depleted.
DY4-2668	Deleted after old stock depleted.

2-3 New Service Parts

PART NO.	CLASS	Q'TY.	DESCRIPTION
DY4-2742-000 000	C	1	GEAR
DY4-2743-000 000	C	1	GEAR

5. Parts Control Information

5-1 Deleted parts : N/A

5-2 Changed parts :

DG1-0830-000	New only stocked.
DG1-0912-000	New only added after old stock depletion.
DG9-3420-000	New only stocked.
DH4-0207-000	New only stocked.

5-3 New Service Parts

PART No.	CLASS	Q'TY.	DESCRIPTION
WK2-0229-000	C	1	OSCILLATOR, CRYSTAL (6 MHz)

Canon VIDEO SERVICE MANUAL REPORT

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Technical Service Department, Canon Inc.

Report No. AD-397P·S 1/2

Date March 20, 1990

Canon E640E, F

PAL

SECAM

1. Main microcomputer IC601 change
2. GRIP C.B.A. Change
3. Classification No. on AD-388
4. Parts Control Information

1. Main microcomputer IC601 change

1-1 Change

To improve a jitter performance in self-recording/playback at low temperatures, the main microcomputer IC601 has been changed from the third to the fourth.

Indication on packages :

3rd		4th
P80116-530	→	P80116-534

1-2 Classification :

E640E ; Changed from 04.
E640F ; N/A (production discontinued)

1-3 Repair Information

To repair the above symptom, replace IC601 with the fourth version.

The fourth IC601 (DH4-0207-000) and the new SS C.B.A. (where the fourth IC601 is installed) only are stocked.
(SS C.B.A.: DG1-0912-000)

2. GRIP C.B.A. Change

2-1 Change

1) To repair a picture shaking caused by an instability of automatic frequency control system, the following constants and rating of adjustment have been changed.

   - R2909 470 kΩ → 1 MΩ (VR5-2770-105)

   - 6-1 Free-run frequency adjustment (PII-32)

     SPEC. 15.9 ±0.05 kHz → 16.5 ±0.05 kHz

Canon VIDEO SERVICE MANUAL REPORT
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Technical Service Department, Canon Inc.

Report No. AD-388P·S 1/3
Date January 20, 1990

Canon E640E, F

PAL
SECAM

1. Main Microcomputer IC601 Change
2. Classification No. Change
3. AF C.B.A. Change
4. Camera Key (1) C.B.A. Change
5. Parts Control Information

1. Main Microcomputer IC601 Change

1-1 Change

To enhance reliability in editing operation via STOP → POWER OFF (LP mode), the main microcomputer IC601 has been changed from the second to the third version.

- Indication on packages (ROM NO.) :

  2nd version ; P80116-527
  3rd version ; P80116-530

With this change, the ratings for ATF Bias adjustment (5-3, PⅡ-27) have been changed as follows.

IC601 ROM NO.	Ratings (ATF Bias)
1st P80116-518 2nd P80116-527	70 ±3H
3rd P80116-530 After above	80 ±3H

The new IC601 (DH4-0207-000) only are stocked.

1-2 Classification : Changed from 03. (PAL)
Informed later. (SECAM)

1-3 Repair Information

1) To repair the faulty editing operation, replace IC601 with the third version.
2) For the ATF Bias adjustment, use the above revised ratings according to the ROM No. of IC601.

2. Classification No. Change

2-1 Change

For better performance of equipment, the parts inspection procedures in our plant have been changed.

2-2 Classification : Changed from 02.

3. AF C.B.A. Change

3-1 Change

For better performance of focus/zoom memory function, the AI microcomputer has been changed.

The new AF C.B.A. (DG9-3420-000) only are stocked.

3-2 Classification : Not changed.

4. Camera Key (1) C.B.A. Change

4-1 Change

For better performance of focusing function, X2801 on a Camera Key (1) C.B.A. has been changed.*

* Due to the miscommunication rarely occurred between the camera key microcomputer (IC2801) and the AI microcomputer (IC4003), the indication of focus mode on EVF display does not function properly. (Rarely, the indication of mode and the actual focusing operation are not corresponded.)

	Old		New
X2801	8 MHz	→	6 MHz (WK2-0229-000)

4-2 Classification : Informed later.

4-3 Repair Information

1) To repair the above symptom, replace X2801 with a 6 MHz one.

   The new camera key (1) C.B.A. (DG1-0830-000) only are stocked.

   Note : For manufacturing efficiency, X2801 are installed Sideways in some equipments, however, it does not matter with the performance.

2) When replacing the AF C.B.A. of equipment before the above classification No., replace X2801 with a 6 MHz one.

Canon VIDEO SERVICE MANUAL REPORT
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Technical Service Department, Canon Inc.

Report No. AD-377P·S 1/2

DateNovember 20, 1989

Canon E640E/F

PAL

SECAM

1. Main Microcomputer Change
2. Repair Instruction Correction (ATF Bias Adjustment)
3. Parts Catalog Correction (JOG C.B.A.)
4. Parts Control Information

1. Main Microcomputer Change

1-1 Change

To match an adjustment tool in plant, the main microcomputer IC601 has been changed from the first to the second version.

ROM No. :			
	1st	→	P80116-518
	2nd	→	P80116-527

1-2 Classification : Changed from 01.

2. Repair Instruction Correction (ATF Bias Adjustment, PⅡ -27)

2-1 Correction

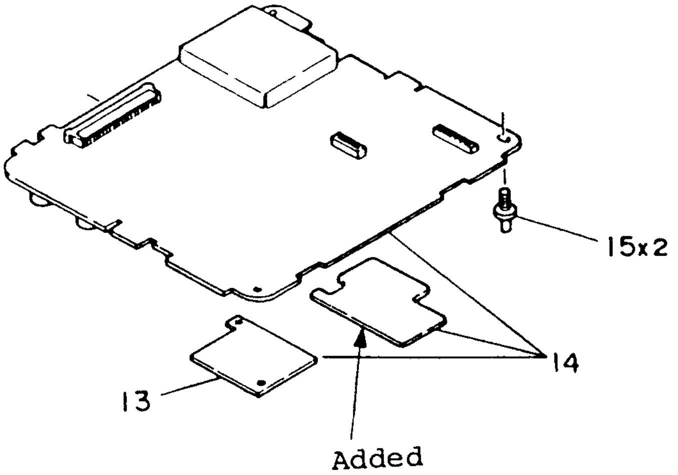
The rating for the ATF Bias Adjustment (5-3, PⅡ -27) is corrected as follows.

	Error		Corrected
SPEC.	ATF = 80 ±03H	→	ATF = 70 ±03H

3. Parts Catalog Correction (JOG C.B.A., PⅢ-5)

3-1 Correction

The JOG C.B.A. (DG1-0828-000) is added as follows.



4. Parts Control Information

4-1 Deleted parts : N/A

4-2 Changed part : DG1-0828-000 Add this part to the parts list.

4-3 New Service Parts : N/A

Canon VIDEO SERVICE MANUAL REPORT

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Technical Service Department, Canon Inc.

Report No. AD-367P·S 1/2

Date October 20, 1989

Canon E640E, F

PAL

SECAM

1. Classification No.
2. UL Tape Addition (VIDEO C.B.A.)
3. AF C.B.A. Change
4. Parts Control Information

1. Classification No.

The classification No. of the product mentioned in the title are stamped as follows.

88 00 00001

00001 → Serial No.

00 → Classification No. (from 00)

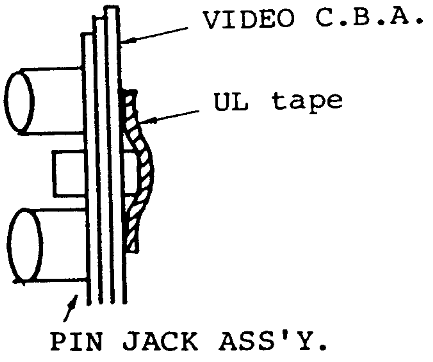
88 → *Year/Month manufactured

Year \ Month	1	2	3	4	5	6	7	8	9	10	11	12
'89								88	89	90	91	92
'90	01	02	03	04	05	06	07	08	09	10	11	12
'91	21	22	23	24	..	.....	...					
⋮												

2. UL Tape addition (VIDEO C.B.A.)

2-1 Addition

To prevent a 5V power supply terminal cap (reverse sid of PIN JACK ASS'Y.) from dropping off, a UL tape has been added as follows.



2-2 Classification : N/A

3. AF C.B.A. Change

3-1 Change

For better performance of AF/Zoom memory functions, AI microcomputer is changed.

The new type AF MAIN C.B.A. (changed AI microcomputer installed) only are stocked. (DG9-3420-000)

4. Parts Control Information

4-1 Deleted parts : N/A

4-2 Changed part : DG9-3420-000 New only stocked.

4-3 New Service Parts : N/A